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CONTENTS.

PAGE

1. ON THE AGRICULTURE OF THE ISLANDS OF ORKNEY. By ROBERT OLIPHANT PRINGLE, ... 1
2. ON THE AGRICULTURE OF THE ISLANDS OF ORKNEY. By THOMAS FARRALL, ... 68
3. ON THE STEM AND BRANCH PRUNING OF CONIFERS. By ROBERT HUTCHISON, ... 100
4. ON THE STEM AND BRANCH PRUNING OF CONIFERS. By JOHN B. WEBSTER, ... 106
5. ON FENCING AND SHELTER OF MOUNTAIN SHEEP WALKS. By PATRICK R. LATHAM, ... 114
6. ON THE TREATMENT AND MANAGEMENT OF OAK COPPICE IN SCOTLAND. By ANDREW GILCHRIST, ... 118
7. ON THE RECLAMATION AND PROTECTION OF AGRICULTURAL LAND. By DAVID STEVENSON, ... 132
8. ON THE COMPARATIVE ADVANTAGES OF APPLYING MANURE TO THE STUBBLE IN AUTUMN, OR IN THE DRILLS IN SPRING, FOR TURNIPS, POTATOES, OR BEANS. By THOMAS FARRALL, . . 174
9. ON THE AGRICULTURE OF THE ISLANDS OF SHETLAND. By HENRY EVERSHED, ... 186
10. ON THE AGRICULTURE OF THE ISLANDS OF SHETLAND By ROBERT SCOT SKIRVING, ... 229
11. ON ABERDEENSHIRE WOODS, FORESTS, AND FORESTRY. By ALEXANDER SMITH, ... 264
12. ON THE COMPARATIVE PRODUCTIVENESS AND GENERAL QUALITIES FOR USE AND KEEPING OF THE DIFFERENT KINDS OF SWEDISH, YELLOW, AND WHITE TURNIPS, GENERALLY USED IN FIELD CULTURE. By GEORGE BRUCE, ... 303
13. ON TREES, CHIEFLY CONIFERS. By ALEXANDER GRAHAM SPEIRS, 309
14. ON EXPERIMENTS FOR ASCERTAINING THE ACTUAL ADDITION OF WEIGHT TO GROWING OR FATTENING STOCK BY THE USE OF DIFFERENT KINDS OF FOOD. By ALFRED HARWOOD, . . 312
15. ON THE EFECTS OF WET AS COMPARED WITH DRY SEASONS, ON WOODS, FORESTS, MOORS, GAME, &c. By C. Y. MICHIE, . 323
16. ON THE GROWTH AND MANAGEMENT OF SCOTCH FIR FORESTS. By JOHN B. WEBSTER, ... 338
17. ON THE MOST PROFITABLE VARIETIES OF TREES FOR PLANTING WITH A VIEW TO EARLY REALISATION AND PROFIT, ESPECIALLY WILLOWS AND POPLARS. By ROBERT HUTCHISON, . 347
18. REPORT BY A COMMITTEE OF THE SOCIETY ON THE RESOLUTIONS ADOPTED BY MEETING OF MEMBERS HELD AT ABERDEEN ON THE 24TH OCTOBER 1873, ... 356

APPENDIX (A).

PAGE

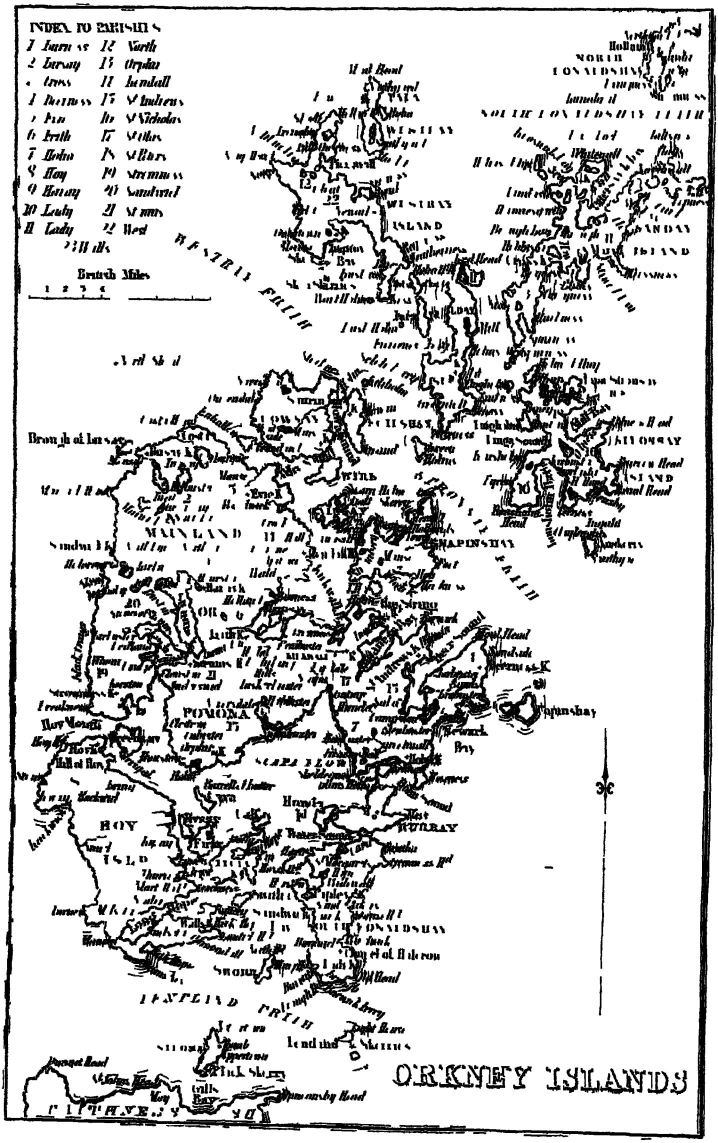
PROCEEDINGS OF THE HIGHLAND AND AGRICULTURAL SOCIETY—

Proceedings at Board Meetings, February 1873 to January 1874, ... 1
Proceedings at General Meeting, 28th June 1873, . . 15
Proceedings at General Meeting, 21st January 1874, . 22
Premiums awarded by the Society in 1873—
  I. Reports, 1873–74, ... 35
  II. Stirling Show 1873, ... 35
  III. District Competitions. 53
    Special Grants, ... 57
    Medals in aid of Premiums given by Local Societies, 57
    Ploughing Competitions, ... 62
  IV. Cottages and Gardens, ... 66
  V. Veterinary Department, Medals to Students, . 68
  VI. Agricultural Chair, Edinburgh University, Prizes to Class, ... 68
State of the Funds of the Society at 30th November 1873, . 69
Abstract of the Accounts of the Society for 1872–73, . 70
Abstract of the Accounts of the Stirling Show, 1873, . 72
Abstract of the Accounts of the Argyll Naval Fund for 1872–73, ... 74

APPENDIX (B).

PREMIUMS OFFERED BY THE HIGHLAND AND AGRICULTURAL SOCIETY IN 1874—

General Notice, ... 3
Constitution and Management, ... 4
Establishment for 1874, ... 5
Committees for 1874, ... 7
Agricultural Education, ... 10
Veterinary Department, ... 14
Forestry Department, ... 17
Chemical Department, ... 19
  Instructions for selecting Samples for Analyses, . 20
  Charges for Analyses, &c., ... 20
General Regulations for Competitors, . . . 22
Class I., Reports, ... 23
Class II., District Competitions, ... 33
  Special Grants, ... 39
  Medals in aid of Premiums given by Local Societies, . 39
Ploughing Competitions, ... 47
Cottages and Gardens, ... 47
General Show at Inverness in 1874, ... 53
General Show at Glasgow in 1875, ... 72
List of Members admitted since January 1873, . . 76


INDEX TO PARISHES
British Miles
NORTH RONALDSHAY
SOUTH RONALDSHAY FRITH
WESTRAY
ISLAND
SANDAY
ISLAND
WESTRAY FRITH
MAINLAND
SHAPINSHAY
POMONA
SCAPA FLOW
HOY
ISLAND
BURRAY
SOUTH RONALDSHAY
PENTLAND FRITH
Stroma
Copinshay
Bay
CAITHNESS
ORKNEY ISLANDS

Edinburgh

TRANSACTIONS

OF

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

ON THE AGRICULTURE OF THE ISLANDS OF ORKNEY.

By Robert Oliphant Pringle, Editor, *Irish Farmers' Gazette*, Dublin.

[*Premium—Thirty Sovereigns.*]

INTRODUCTION.

The Orkney Islands are separated from the county of Caithness, the north-eastern extremity of the mainlaid of Scotland, by the Pentland Firth, which is from 5½ miles to 8¼ miles in breadth. They lie between 59° 23′ 2″ and 58° 41′ 24″ N. latitude, and between 2° 22′ 2″, and 3° 25′ 10″ W. longitude. The extreme length of the area occupied by the group is about 44 miles, and the extreme breadth about 35 miles. According to the survey made by Captain Thomas, the islands contain about 207,200 acres. The number of islands in the group is 73, but of these 17 are stated to become peninsulas at low water. Twenty-nine islands are inhabited, and of the small islands, or *holms* as they are designated, many are so limited in extent as to be capable of pasturing only a few sheep. The islands lie closely together, the firths, or "sounds," which separate them being from one or two miles to four or five miles in breadth. The tides run through these firths with great rapidity, which renders the passage dangerous to those who are strangers, but the natives are so well acquainted with the tides as to be able to make good passages from one island to another, even with contrary winds, when the tide is favourable.

Hoy is the most mountainous of the Orkney Islands. The Ward hill of Hoy, which is the highest land in Orkney, rises to an elevation of 1555 feet. There are ranges of hills in the western part of the island of Pomona, or, as it is called, the Mainland of Orkney, the highest being the Ward hill of Orphir, which is 876 feet. The island of Rousay is also hilly, but in the other islands the hills are not of any considerable height, Fitty hill in Westray being perhaps the highest, and its elevation is 541 feet. Some of the islands lie low and flat. In general they are highest at the west side, forming bold precipices of considerable elevation. Thus, the western face of the island of Hoy rises 1000 feet perpendicular; and Costa Head, on the north-west point of the Mainland, is 478 feet high. In other cases the land usually slopes gently down to the sea, and cultivation is carried on until the plough is stopped by the sea-beach. Those who have been accustomed to imagine Orkney a wild, "storm vext," and semi-desolate region, would be suprised at the peculiar softness of outline presented by the islands when viewed from a favourable position. From their close proximity to each other, the sea which divides them appears like a series of large inland lakes, studded with boats and vessels of all descriptions; while the close cultivation which has now become so general in Orkney imparts a varied and pleasing appearance to the scenery, notwithstanding the absence of woods and plantations, which are usually regarded as essential to the beauty of a landscape.

One great advantage possessed by Orkney consists in the number of excellent roadsteads which are to be found in all parts of the islands, and afford shelter to shipping from all winds. Considering that the sea must always continue to be the great highway in Orkney, the number and excellence of its harbours and roadsteads is matter of great importance to the country.

Geology; Soils.

On this subject I take leave to quote from an eminent authority. "The geology of the Orkneys, like that of Caithness," says Hugh Miller, "owes its chief interest to the immense development which it exhibits of one formation—the lower old red sandstone—and to the extraordinary abundance of its vertebrate remains. It is not too much to affirm, that in the comparatively small portion which this cluster of islands contains of the *third* part of a system, regarded only a few years ago as the least fossiliferous in the geologic scale, there are more fossil fish enclosed than in every other geologic system in England, Scotland, and Wales, from the coal measures to the chalk inclusive. Orkney is emphatically to the geologist what a juvenile Shetland poetess designates her country, in challenging for it a standing independent of the 'Land of Cakes'—a 'Land of Fish;' and, were the trade once fairly opened up, could supply with ichthyolites, by the ton and the shipload, the museums of the world. Its various deposits, with all their strange organisms, have been up-tilted from the bottom against a granitic axis rather more than six miles in length by about a mile in breadth, which forms the great backbone of the western district of Pomona; and on this granitic axis, fast jammed in between a steep hill and the sea, stands the town of Stromness." The clay-slate found in Orkney has been much used for roofing, but it makes a heavy roof, and Welsh slates are now used in place of the native material. The clay-slate, however, when taken some depth from the surface, makes a good building stone. In some parts of the West Mainland and in the island of Hoy, trap rocks occur, chiefly as whin dikes through the clay-slate.

The soils of Orkney vary from a drifting sand to a heavy loam. Peat mosses are also found in different parts of the islands, but in several instances these mosses are becoming run out, and several of the islands, especially in the "North Isles," are now totally without peat. Owing to the prevailing rock being clay-slate, a large proportion of Orkney consists of clay soil and subsoil, and when the clay is of a rich red colour, as it is for the most part, the results are highly favourable when the land is brought into cultivation. Uncultivated tracts are generally covered with a thin layer of peaty soil, which produces a short, stunted heath, intermixed with coarse grasses, but these speedily disappear under the action of the plough. Perennial red clover, or cow grass, and also white clover, grow naturally with great luxuriance wherever there is any calcareous sand in the soil, and even in places where one would scarcely expect to meet with such plants. Although Orkney is now and has long been destitute of forest trees, with the exception of some comparatively recently formed plantations, chiefly about the seats of a few resident gentlemen, it is evident that the country at one period was covered with timber, the roots and stumps of large trees being frequently found in peat mosses, along with the horns of deer, and those o the *Bos longifrons,* which Owen conjectures was the domesticated species in the British Isles anterior to the Roman invasion. In some parts of the Orkney Islands portions of submerged forests have also been found, "where the stems of pines adhering to their parent soil are seen laid prostrate by the waves, and covered with sand, after the fall of the rocks on which they grew."

Climate.

Many persons who are unacquainted with Orkney imagine, from the high northern latitude of the islands, that the climate, more especially during winter, must be very severe. This, however, is not the case. The Gulf-Stream, which runs direct to Orkney, and leaves on the shores of the islands seeds and other productions of the West Indies, raises the temperature of the surrounding ocean, and thus frost and snow rarely occur for any lengthened period. On this subject there exists ample information. The Rev. Dr Clouston, minister of Sandwick parish, in the West Mainland, has made the climate of Orkney a special subject of investigation for a period extending over the last forty years, and I need scarcely say that Dr Clouston is well known as one of the most accomplished meteorologists of the day. Dr Clouston's pursuit of this branch of science has stimulated others to carry out similar investigations in other parts of the islands, and the results are published in various scientific journals, and also at monthly intervals in the local papers.

The following particulars from Dr Clouston's "Meteorological Observations taken in Orkney" throw much light on the subject :—

Mean Temperature of the Air in Shade.

January,	38·50	July,	55·14
February,	38·25	August,	55·08
March,	40·30	September,	52·49
April, .	43·28	October,	47·52
May, .	47·86	November,	42·63
June, .	52·83	December,	40·96
Annual mean, ...	46·24		

Mean Temperature of the Atlantic on the Shore of Orkney.

January, . .	44·90	July, . . .	53·36
February,	44·17	August,	55·14
March,	43·34	September,	55·13
April, .	44·09	October,	52·78
May, .	46·93	November,	49·63
June, .	50·22	December,	47·41
Annual temperature of sea, . .	48·93		

The mean annual temperature of the sea is thus above that of the air, and notably so in January, February, March, September, October, November, and December. "It is even above the mean temperature of any year yet recorded, and a little above that of the sea around the coast of Scotland. This," says Dr Clouston, "seems one of the strongest proofs that the Gulf-Stream reaches the shores of Orkney, and that it raises the temperature of the sea beyond what it could be raised by the power of the sun, and higher than it raises that of the air, the soil, or the springs."

Mean Rainfall at Sandwick Manse, 75 feet above sea-level.

January,	4·29	July, .	
February,	3·11	August,	2·84
March,	2·71	September,	2·72
April,	1·86	October,	4·85
May,	1·55	November,	3·89
June,	2·17	December,	4.33
Mean annual rainfall, . . .	36·95		

Sandwick manse being situated near the west coast has a larger average rainfall than there is in the eastern portion of Orkney. Thus, the average rainfall at Balfour Castle, in Shapinshay, from 1862 to 1871, both years included, was 31·89 inches. The average rainfall in Orkney for nine years, 1863 to 1871 inclusive, was 34·55 inches; and in 1872, a remarkably wet year all over Europe, it was 41·03 inches, or only 6·48 inches above the mean. Dr Clouston concludes from his observations "that the mean annual temperature of Orkney is equal to that on the southern border of Scotland, but much more equable,—neither so hot in summer, nor so cold in winter; that the mean annual quantity of rain is probably near the average of Scotland; that winds from the south and west, and neighbouring points, prevail much more than from the opposite quarters, and probably tend much to promote the mildness of the climate, but this is ascribed principally to the surrounding ocean, the mean temperature of which is 3° above that of the air, and much more in winter, so that it greatly elevates the temperature then, and depresses a little that of summer."*

Population.

The population of the Orkney Islands in 1831 was 28,047; in 1861, it had increased to 33,395; but in 1871 it was 31,241, being a decrease of 2154 persons in the last ten years. The inhabited houses in 1861 were 6064, and at the last census 6301.

The majority of the Orcadians show evident tokens of their Scandinavian origin, especially in the North Isles; and the whole of Orkney teems with names of families and places derived from the same source. Although it is many years since the Norse language died out in Orkney, there are still many words or phrases in daily use which have come down from the time when Norse was the general language of the people. Gaelic has never been spoken by any native of Orkney.

The people naturally possess a courteous, kindly, cheerful disposition, and are quiet and moral in their habits. A police force, consisting of a superintendent and two constables, lead an easy life among the thirty-one thousand peaceable Orcadians. The county jail in Kirkwall is usually, for most part of the year, "a house to let," and as it is both an old and an ugly building, which interferes very much with the view of the west front of the grand old

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* The following plants were in flower on the 1st of December 1871, in the grounds at Balfour Castle, Shapinshay.—Roses (many varieties), pansies, Nemophila (blue), Nemophila maculata, purple and white stocks, carnations, honeysuckle, Escholtzia, fuchsia, alyssum, Escallonia macrantha, mignonette, wallflower, auricula, gladiolus (scarlet), sweet pea, linum, snapdragon, scarlet geraniums, Convolvulus minor, Virginian stock, lobelia, Clarksia, candytuft, yellow jasmine, petunia, Shortia californica, hollyhocks, Silene pendula, Linaria speciosa, strawberry, daisy, dandelion, red clover, cornflower, milleflower, dead nettle, cow thistle, wild mustard, tormentil, whin, violet.

Cathedral of St Magnus—the glory of Orkney—it is to be hoped it will soon be swept away. The principal offenders against the public peace in Orkney appear to be tramps from the south—or "land-loupers" as they used to be called in Orcadian phraseology—who occasionally allow "the maut to get above the meal," and so become pugnacious. One marked evidence of the moral character of the Orkney people is the low place which their county occupies in certain disreputable statistics, published from time to time by the Registrar-General. Emigration to the colonies has never proceeded to so great an extent from Orkney as it has done from other parts of Scotland. The Hudson's Bay Company have, however, for many years obtained their staff of labourers, tradesmen, clerks, &c., chiefly from Orkney. Young men trained to business or as tradesmen in Orkney naturally seek a wider field of labour in the south; and as there is little employment in Orkney for young women, save in agriculture, since the cessation of the straw-plait manufacture, numbers of girls go south annually, where they readily find situations as domestic servants, being much esteemed in that capacity for their honesty and good moral character.

Former state of Agriculture in Orkney.

In order fully to understand the progress which agriculture has made within the last twenty-five years in the Orkney Islands, it is absolutely necessary to give in the first instance an account of the agriculture of the country previous to that period. This is the more needful from the fact that the revolution which has taken place in the agricultural condition of Orkney has been chiefly effected during the last thirty years. In making the following remarks on this part of the subject, it may, however, be as well to state that I am guided, in a great measure, by my own personal recollections of the former state of agriculture in Orkney; at the same time, I may find it necessary to refer in one or two instances to other authorities, at least with respect to causes which had an effect on the condition of the country.

To say that the agricultural condition of Orkney, previous to the period above mentioned, was backward, would but faintly convey a correct idea of its actual state. It was not only backward, as compared with other counties in Scotland,—with the neighbouring county of Caithness, for instance,—but in many respects it was in nearly as primitive a state as it must have been when the islands were given as a mortgage for the marriage portion of the Princess Margaret of Denmark on her union with James III. of Scotland. The system of government which was pursued after the islands became annexed to Scotland, and down, in fact, to a very recent period, was such as effectually to crush any attempt that might be made towards improvement.

It would be out of place here to enter into any historical details of Orkney, although such would be required to throw light on the causes which retarded the improvement of the country, and affected materially the social condition of the people. As it is, however, a subject of much interest, I may be permitted to avail myself of the following vigorous summary of the matter, as given by Colonel Balfour of Balfour and Trenabie, the largest proprietor in Orkney, in his "Odal Rights and Feudal Wrongs," which was published at Edinburgh in 1860. Colonel Balfour says—

"Since they (*i.e.*, the Orkney Islands) were severed, more than three centuries ago, from the kindred rule of Norway, their history has been a continuous tale of wrong and oppression, of unscrupulous rapacity and unheeded complaint. *Recipe, non Rapui*, might have been the characteristic motto, as that shadowy distinction between the merits of the thief and the receiver has been the plea of every government under which they have since been ruled or misruled. Regarded as aliens, of no value beyond the revenue or plunder which could be extorted from them, they have been granted, revoked, annexed, re-granted, confiscated, and re-annexed, with wearisome monotony of torturing change. Five times they have been formally annexed to the Crown by Act of Parliament, and fourteen times committed, in defiance of such acts, and without either protection or redress, to one needy and rapacious courtier after another. Each donatory or tacksman, aware of his precarious opportunity, took for granted all previous exactions, and sought further profit in some mine of advantage hitherto unwrought, till the growing burden of extortion wrung from the islanders a cry of oppression too loud to be smothered, and then the Government sometimes disavowed or removed the indiscreet official, who could not conduct his pillage with decorum. But in general it was blind to all such profitable enormities, and deaf to all complaints, unless the complainer could give interest to his case by charges of treason, of embezzlement of royal revenues, or, above all, of coquetting with the dangerous claims of Norway. In such a case the oppressor became perhaps a victim, and was forfeited, imprisoned, or beheaded, not for oppressing the subject, but for alarming the Crown. But every change was to the islanders only a change of tyrant, and their complaints served only to warn the new donatory of the rocks and shoals on which his predecessor had made shipwreck of the thriving trade of robbery. The Crown might do justice on the oppressor, but it invariably appropriated his plunder, and adopted his profitable exactions as prescribed rights and precedents for further claims. Laurence Bruce was removed, but his false weights and measures still prevail. Lord Robert Stewart was imprisoned, but the doubled teind was not reduced nor the escheated land restored; both still form parts of the estate of the Crown and its donatory; and the culprit was reponed with higher powers, to wreak vengeance on his accusers. Earl Patrick was beheaded, but his feudal casualties and illegal exactions and decreets were still enforced for the benefit of all future donatories. The Bishopric lands have been—in the language of the New World—annexed by the Crown, and sold to plant the parks of London, but their chartered obligation to uphold all ecclesiastical buildings has been transferred to the other landowners. The fictitious debt and mortgage to William Earl of Morton [1643] were cancelled, only to enhance his powers, profits, and peculations, by the sanction of a surreptitious Act of the British Parliament. Other Scottish counties were relieved of the 'Auld Extent' when the new cess was imposed; Orkney and Zetland still pay both—to the Crown the British Land Tax—to its donatory the 'Skat' of Norway. The very enormity of such anomalies makes it hard to believe them possible in a place and time so near our own, and harder still to persuade the nineteenth century, and its self-complacent admiration of the just and enlightened rule of Britain, that much of the evil still exists uncorrected and unredressed in this the twenty-third year of Queen Victoria."

In 1614 Bishop Law established a rental of the Crown and Bishopric lands, by which rents were made payable in kind, that is, in grain, butter, "flesh" (cattle), &c., and this system lasted until within the last twenty-five years. The amount exacted was a most oppressive burden on the agriculture of the country, besides its injurious effects in other respects. In illustration of this I shall here refer to an article well known to Scottish sheep farmers only a few years ago, but which is not to be found in the market at the present day. One of the ingredients formerly employed in making smearing stuff for sheep on hill farms was "Orkney grease butter." The article known by that name was butter which was paid as rent by tenants in Orkney, and was a compound of rancid butter, mashed potatoes, coarse salt, and dirt. On melting it previous tô mixing it with tar, I have frequently found enough coarse salt left at the bottom of the pot to constitute nearly one-third of the entire weight, and along with the salt it was not unusual to find also a quantity of gravel as part of the mixture. Sometimes the adulteration, if it may be so called, consisted of a good-sized stone encased in a lump of butter, as weight, not quality, was the object aimed at in preparing the article for the factor. The abolition of the system of paying rent in kind has done away with all this; and the butter now made in Orkney is very good. Dairy produce, however, is not a leading point in Orkney farm management, nor is it likely to be so while there are so many inducements to rear calves well. The same cause which operated prejudicially upon the manufacture of butter in Orkney acted in a similar manner upon the production of grain, which has also improved vastly under a better system of estate management.

Reference has been made by Colonel Balfour, in the extract from his work given in a preceding page, to the false weights and measures introduced into Orkney by Laurence Bruce, as prevailing so late as 1860. It is necessary, therefore, to offer some explanation on this point; and, as the best source of information, I return to Colonel Balfour's work, where he says, that "of measurement by weight, the instruments were,—1*st*, the *Pundar* or *Pundlar*, identical with the steel-yard or *statera*, and of two kinds—the *Malt Pundar*, for weighing malt and other bulky articles, and the *Bere Pundar*, for bere only, using the same weights, but each a third less than the same denomination on the Malt Pundar; and, 2*nd*, the *Bysmar*, on which were weighed the butter and other articles requiring more minute mensuration. The weights in use were—

8 Eyrar or Ounces . .	= 1 Mark of ½ lb.
24 Marks . . .	= 1 Lispund, Span, Setteen, or Stone.
6 Lispunds . . .	= 1 Meil.
24 Meils . . .	= 1 Last.

"Of measurement by capacity, the instruments were the Can, or *Kanna* of Norway, and the Barrel or *Bariel* of 15 Lispunds.

48 Cans of Oil, or 15 Lispunds of Butter .	= 1 Barrel.
12 Barrels, 180 Lispunds, or 576 Cans . .	= 1 Last.

"The standards of weight and measure were unchanged till Earl Robert, by raising the weight of the fundamental mark from 8 to 10 ounces, added in the same proportion of one-fifth to every other denomination. Earl Patrick increased the mark to 12 ounces, thus adding one-third to every Lispund, Meil, and Last; and subsequent donatories improved the profitable example by aggravating the mark to 20 ounces, and thus boldly achieving an increase of 250 per cent. upon every denomination of weight or measure. The only apparent exception was the Barrel, which, being a vehicle of foreign export, could not be enlarged, and consequently could only contain 10 of these aggravated Lispunds instead of 15 of the normal size; but the balance was charged in *loose Lispunds* of similar overweight."*

These particulars are interesting, because they show that the people of Orkney had to contend for centuries against artificial or fiscal difficulties, in addition to those of a physical nature, arising from the geographical circumstances of the country, entailing difficulty of communication and remoteness from markets, and also from the nature of the climate, &c. It appears, in fact, almost miraculous that the country did not become absolutely depopulated under the extraordinary exactions imposed upon the people in former times.

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* The ancient weights are still used in the case of payment of feu-duties to Lord Zetland, and some payments in kind to the clergy.—(*Reporter*.)

Previous to the introduction of the improved system of agriculture which now prevails in most parts of Orkney, and, as already stated, which has taken place chiefly within the last thirty years, the state of husbandry in the county, with a few exceptional instances, was of a most wretched description. A large proportion of the acreable area of Orkney consisted of commonty, which was divided from the patches of infield or arable land by turf fences. The commons, besides affording a run during summer to live stock of all kinds, including large flocks of geese, also supplied material which was employed in making up a poor kind of compost which the people put on the arable land. In order to procure compost material for one acre, the surface of several acres was skinned and destroyed; and the result is to be seen at the present day, where land is still lying waste, in large tracts of bare clayey subsoil, studded with small tufts of the original upper soil.

The arable land was held in "runrig," that is, the lands occupied by a number of persons in a township or district were so intermixed that a farmer rarely had half-a-dozen of ridges lying together without some of his neighbours intervening; and not only was this the case, but in several instances the occupants exchanged their plots every year, so that all might have their turn alike of the good or the bad land in a township. The runrig system even extended to land belonging to different proprietors, so that the complications arising out of it were frequently of the most extraordinary nature. As soon as the corn crops were harvested, the sheep were allowed a full range over the arable land, and thus, for six or seven months in each year, the whole country was one common. Under the runrig system a farmer could only be said to occupy his plot or plots of ground for a few months in the year, as during the remaining months his neighbours had as good a right to his land as he had; and, on the other hand, he had an equal right to their lands. The system of runrig was not peculiar to Orkney. It existed in other parts of Scotland, and also in the west of Ireland, where it was only abolished a few years ago. It was founded probably on the principle of mutual defence against enemies, as it gave the occupiers a mutual interest in the produce of their arable lands. Be that as it may, the system was a perfect barrier against improvement. No tenant could improve his land or introduce new crops without the co-operation of all his neighbours; hence it was impossible to cultivate artificial grasses or turnips while the runrig system existed, or where sheep were permitted to run during winter and spring over the arable lands, unless in the case of such farms as were enclosed and in the hands of proprietors.

When Mr Shirreff wrote his Report on the "Agriculture of the Orkney Islands" for the Board of Agriculture (1814), no steps had been taken to alter the universally prevailing system of runrig. The first attempt to introduce a better system appears to have been made in 1828, in which year the estate of Græmeshall, in the parish of Holm, belonging to Alexander Sutherland Græme, Esq., was surveyed, cleared of runrig, and laid out into farms of various sizes. Other wise regulations were enforced on the estate, such as preventing the tenants from flaying the surface of the hill grounds to make compost dunghills, and binding them to the observance of a certain rotation of cropping, and, as a necessary preliminary, enforcing a strict observance of winter herding. About 1831 Mr Robert Scarth also abolished runrig on certain estates under his charge, and from that time the process of "planking," or laying out the land in distinct lots or farms proceeded, but still so gradually that the continued existence of the runrig system was generally complained of so late as 1841–42, by the clergymen of the different parishes, whose reports were published in the "New Statistical Account of Scotland." * The division of the commonties which has been effected since that period, in nearly all parts of Orkney, gave the last blow to the runrig system; as by that division proprietors, when so inclined, were enabled to lay out the land properly, and also materially to increase the size of farms by the addition of a portion of "hill land" to each farm, which, being easily susceptible of improvement, has since become valuable and productive lands.

Until the year 1857 it could scarcely be said that there existed such a thing as a road in Orkney. It is true, the sea was then, as now, the great highway, but the want of roads in the different islands formed a very serious obstacle to the improvement of the country. The roads were mere tracks through the common lands, and when those tracks were confined within comparatively narrow limits, as when passing through arable land, they were often almost impassable for foot passengers or even ponies, much less wheeled vehicles. Manure was carried to the fields, and grain to market, in "creels" or panniers, which were suspended one on each side of a pony. These panniers were locally called "creels" when made of heather, and "cazies" or "cubbies" when made of straw. Carts were few in number, and were chiefly used about the principal farms. Latterly some gigs were brought into the country, but, for most part of the year, travelling by such conveyances, without roads, realised the Irishman's view of the matter when he was put into a sedan chair out of which the bottom had fallen, to wit, that "if it had not been for the name of the thing, one might as well have walked." In 1857 the "Orkney Roads Act" was passed, which empowered the Trustees to borrow to the extent of L.25,000; but as that sum was found insufficient, a supplementary Act was obtained in 1867,

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* Published by William Blackwood and Sons.

renewing and extending the borrowing powers of the Trustees. The result has been that there are now good roads in all the principal islands, which has greatly facilitated the improvement of the country. The Acts above referred to also empowered the Trustees to construct piers or jetties in connection with the roads; but the construction of these very necessary erections will be still more effectually promoted by a special Act, which has recently been passed with reference to this matter.

Until 1833, communication between Orkney and the south depended altogether upon sailing vessels, and the passage between Kirkwall and Leith frequently required a fortnight or three weeks to perform. In 1833 a small steamer called the "Velocity," of some 70 or 80 horse-power, was put on the passage between Leith and Kirkwall, by the Aberdeen, Leith, and Clyde Shipping Company, making the voyage once a fortnight. Being found insufficient for the trade, the powerful steamer "Sovereign" was put on the passage weekly, in 1834 or 1835. The "Sovereign" was succeeded by other vessels; and now there are two powerful steamers plying weekly between Kirkwall and Granton, both being fully employed. The establishment of steam communication proved, as may well be supposed, of immense advantage to Orkney, and may be regarded, in fact, as one of the great primary causes of the present improved agricultural condition of the islands. In addition to the line of steamers above named, an excellent steam-ship, the "Orcadia," makes a round of the North Isles twice a week. The sailing vessels which ply between Kirkwall or Stromness and Leith are also much improved, and make rapid passages. The South Isles are as yet unprovided with steam accommodation in the way of internal communication, with the exception of the small mail-steamer which plies between Stromness and Scrabster, near Thurso, on the south side of the Pentland Firth; but this want will probably be supplied once a pier is built at Scapa, about a mile and a half south of Kirkwall, which is likely soon to take place through the medium of the new Piers and Harbours Act which has been obtained for Orkney.

Communication with the south has also been recently established by means of a telegraph cable, which is carried across the Pentland Firth, and through the islands to Shetland; but it belongs to a private company, and I found the arrangements most unsatisfactory at the time of my last visit to Orkney (June 1872), the charge made for twenty words being six shillings, while in certain of the islands, where stations had been established, the instruments were either out of order or there was no one at the stations capable of working them. The Government ought to take in hand the management of telegraphic communication with Orkney and Shetland, or take steps to prevent the arbitrary imposition of such enormous charges as those which I experienced.*

Under the old system of farming, and down to a comparatively recent date, the arable lands in Orkney were cropped alternately with oats and bear (bigg), without intermission, except where potatoes were grown; but the cultivation of the last-named crop was not sufficiently extensive to make a general break in the alternate succession of oats and bere. Once land was brought into cultivation, it was an established rule that it should never, if possible, be allowed to rest for a single year, and the old-fashioned Orkney farmer, who followed this rule, prided himself that he was "a guid farmer, and never let his land lie ley, like some ither folk." To change the seed never entered into his imagination; and, indeed, it was frequently the worst and not the best of the grain produced upon the farm which was used for seed. As a matter of course, the cropped land was overrun with weeds of various kinds. The produce also was scanty, for the oats chiefly grown was of an inferior description, being a small-bearded grey oat, and the bear also was very light, so that the average yield of oats might be about three times the quantity of seed sown, and of bear five times the quantity.

In 1814, according to Shirreff, ploughing was generally executed with the one-stilted plough—the same implement which elicited Triptolemus Yellowley's indignant denunciation: "Ye scart the land wi' a bit thing ye ca' a pleugh; ye might as weel give it a ritt with the teeth of a redding-kame." This implement had, as stated, but one stilt, and was without any mould-board. The ploughman laid his weight on one side of the implement, and the team, which consisted of four oxen or ponies, was guided by a driver, who walked backwards. The late Rev. Walter Traill, of Lady Parish, defended the one-stilted plough, on the ground that "though a fertile subject of ridicule, it was the ancient plough of Rome, Egypt, and even England." The harrows commonly used consisted of two or three bulls with wooden teeth; but these, too, have long since passed away.

At one period, including a considerable part of the present century, a large quantity of malt was annually made in Orkney. In fact, malt formed the principal item in the payment of teind and feu-duties on the earldom lands, and of rents of the bishopric estates. Malt was also manufactured for private use, sometimes without giving notice to the Excise, and home-brewed ale was made in nearly every farmer's house in Orkney, especially previous to Yule. An Orkney farmer of the last generation could say that he grew his own bear, made his own malt, brewed and drank his own ale; but home-brewing is now, comparatively, little practised. There is room to doubt, however, whether the substitution of coarse south-country whisky for sound home-brewed ale is an improvement.

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* The following paragraph, which I have taken from the *Orkney Herald* of June 18, 1873, shows that the system of overcharging is still in force :—"Last week a West Mainland farmer had, on two separate occasions, to telegraph from Stromness to Kirkwall for a doctor to visit a member of his family who was unwell. A reply to each telegram was necessary, and for these four messages, of less than twenty words each, passing over wires less than fifteen miles in length, he was charged the enormous sum of twenty shillings! In any other part of the country the four messages would only have cost a shilling each. Indeed, he might have sent a message to New York for less money than that charged him by our local company."

Even under the old system of management large numbers of cattle, sheep, horses, and swine were bred in Orkney; and in order to understand the improvement which has been effected of late years, it is necessary to give some account of the original breed.

The cattle were small, a fat cow weighing usually from 2½ to 3½ cwt. The smallness of size was caused chiefly by bad treatment, the cattle being generally starved when young, and afterwards during each winter. Their colour was chiefly black or brown, and sometimes black and white, and also brindled. They had the "crumpled" or turned-in horn. Their carcasses were round in the middle, with prominent rump-bones, and narrow hocks. The skin was soft; the bone fine; and when fat, these cattle produced good flavoured, fine-grained beef. The cows gave a fair quantity of milk considering the nature of their keep, and the milk was of good quality.

The first attempt to improve the breed of cattle in Orkney was made by Captain Sutherland, who resided in the island of Burray, and who was afterwards Lord Duffus. Early in the present century that gentleman introduced West Highland cattle from Dunrobin, and continued to keep up the breed until his death. On visiting Burray in 1837, I found in the possession of Mr Laird, who was principal tenant in the island, a large stock of very superior Highland cattle, the immediate descendants of Captain Sutherland's herd. From Burray the breed spread into some of the other islands, but the Highland cattle were chiefly in the hands of proprietors or the principal farmers. Among others, the late Mr David Petrie, factor on the Græmeshall property, in the parish of Holm, had a good herd of West Highland cattle, the cows of which he subsequently crossed with the short-horn—Mr Petrie being, in fact, one of the first to introduce short-horn bulls into Orkney; and when he got L.5, 15s. each for his cross stirks in 1840, the price was looked upon as something wonderful, which, indeed, it was, seeing that an Orkney cow of the common breed could be purchased at that time for 50s. or L.3, and four-year-old bullocks from L.4 to L.5 each. But although West Highland blood might be met with at that time in different parts of Orkney, the general characteristics of the original breed remained unaltered; and it required the establishment of an improved system of agriculture to effect a great and marked change in the description of cattle bred in the islands.

The original breed of sheep in Orkney was the short-tailed breed common to Shetland and Norway. They were of various colours—white, black, brown, grey, and spotted. They fed to 6 lbs. or 8 lbs. per quarter, the mutton being very delicate, although it had a blackish colour, and a somewhat peculiar flavour —relished by those who were accustomed to it—when the sheep were fed much upon sea-weed, of which they were very fond. They wandered at large over the commons, no attempt at herding being made, except that each owner put his mark on his flock, the different marks being registered in the baron-bailie's book of the parish where the owner resided. These sheep were very wild, and it was only when it was necessary to shear them, or rather to have the wool pulled off, that the different lots pastured on a common were gathered together. There are now few of the original breed remaining, except in the remote island of North Ronaldshay.

Malcolm Laing, the historian of Scotland, attempted to improve the breed of sheep in Orkney by the introduction of Merinos on his property in the islands of Eday and Sanday. Mr Laing began his operations in 1808, and five years afterwards his flock consisted of 1200 sheep, 260 of which were pure Merinos, about 620 crosses of the Merino and Cheviot—the last-named breed having been also introduced by Mr Laing for the purpose of crossing—and the remainder crosses of the Merino with the Orkney breed. Mr Laing was satisfied with the last-named cross, finding that the Orkney breed assimilated faster with the Merino in fleece than the Cheviot. The wool of the Merino-Orkney cross is stated to have been 300 per cent. more valuable than that of the original Orkney sheep. The experiment did not, however, effect any permanent alteration in the character of the Orkney breed, and was finally abandoned. The Merinos were liable to foot-rot, although Mr Laing's flock does not appear to have been so liable to that disease as Merinos in other parts of the kingdom; nor did he find it necessary to have their feet encased in stout leather boots as Sir John Sinclair did when he introduced the breed into Caithness.

About thirty years ago, some half-bred sheep were imported from Caithness into Orkney, and since that time Cheviots and Leicesters, the latter mostly rams, have been largely imported and bred from, so that those breeds and crosses of them with each other, or with the native breed, now form the description of sheep met with in nearly all parts of Orkney. Half-bred lambs have this year (1872) been sold in large numbers at 32s.

to 35s. each in Orkney to south-country dealers and farmers; and the price of one of those lambs would have bought a score within my own recollection.

The old Orkney "garron" ranged from 12 to 14½ hands high. This was a strong, cob-like class of horse, very enduring and docile. The breed is now extinct, having been crossed out by other breeds, chiefly by the Clydesdale. Some years ago the late Earl of Zetland sent down "Hawk," a thorough-bred stallion, to his estates in Orkney, and his produce were so good, when put to garron mares, that not one of his stock was left in the country, having been all picked up by dealers. His Lordship since that time sent another thorough-bred stallion to Orkney, and I saw some very nice colts and fillies got by him out of compact mares, which in all probability went back to garron blood.

The native breed of swine in Orkney was small in size, and either black or red in colour. They had flat sides, with high backs, and long stiff bristles, under which was a coating of fur or coarse wool. Little attention was given to their management. During summer they ranged through the commons, turning up roots, upon which they fed, and looking, when started out from among the heather, more like the wild swine of other countries than domesticated animals of the British islands. When put up to feed, they made flesh rapidly, and their flesh, especially in the form of smoked ham, was uncommonly delicate and fine flavoured. This, however, was not the case when fish formed part of their food, as they then acquired a flavour which was neither fish nor flesh. Whales are frequently driven ashore in Orkney; and where any of these wandering swine got access to the carcases, when these were left to rot on the beach after the blubber had been removed, the flesh acquired a flavour which might have pleased an Esquimaux, but was rather too strong for a British stomach.

Poultry has always formed a prominent feature in the live stock of an Orkney farm, and a considerable export trade is carried on in eggs. Since the division of the commons, and the subsequent reclamation of large tracts of what was formerly waste land, geese are not bred to the same extent as formerly. There are still, however, considerable numbers of them reared throughout the islands. The breed is for the most part small, and the introduction of the Embden breed or the grey Toulouse breed to cross with, would, I think, be an improvement.

Formerly, unless in the case of large farms, leases were unknown; nor could leases well be granted so long as the land was held in runrig. As the farms were squared and arranged upon a proper plan, leases became more common; and I believe that at the present time a large majority of the tenants in Orkney hold their land under leases or agreements.

The ancient custom of "steelbow" prevailed to a large extent in Orkney, and included live-stock, implements, &c. At one time this was perhaps a beneficial custom, but, under existing circumstances, it could not be carried out, at least in its entirety, and it is therefore no longer a feature in Orkney farming.

Thirty years ago, from 2000 to 3000 women were employed in Orkney in the straw-plait manufacture, which had been introduced into the country about 1806 or 1807. At first, and for several years, the straw was brought from London, but latterly a sufficient quantity of rye was grown in Orkney to furnish material for the manufacture. This source of employment is not now in existence; and this termination of it seems to have been anticipated by the Rev. Dr Clouston, when he wrote his report of the parish of Sandwick in 1841, as he said in that report, referring to the straw-plait manufacture, that "it is a serious objection that the whim of a London lady may render it unfashionable to appear under a thatch of straw, and thus at once throw destitute 3000 Orcadian damsels." The agricultural returns for 1871 state, that 48 acres were sown with rye that year in Orkney, but it does not appear that the straw was used in the manufacture of straw-plait.

Present Condition of Agriculture in the Orkney Islands.

Having given in the foregoing remarks a general review of the agricultural condition of Orkney previous to, and even to some extent within, the last twenty-five years, I now come to describe the present condition of agriculture in the islands, and the various improvements which have been recently effected. In doing so, I purpose to carry the reader along with me, as it were on a tour through the different islands; by which means we shall be better enabled to see what has been done throughout the country than we would do if the different subjects were merely arranged under formal heads.

The Orkney Islands are divided into three sections:—1*st*, The North Isles, or those which lie to the north of the Mainland or Pomona; 2*d*, The Mainland itself; and, 3*d*, The South Isles. This is not a mere fanciful division, for there are actually certain natural features which authorise it; and it is, moreover, the division adopted by the Orcadians themselves when speaking of the country.

North Isles.—Taking Kirkwall, the capital of Orkney, as our point of departure, the first of the group we reach, which goes under the general name of the "North Isles," is the island of Shapinshay. This island is altogether the property of Colonel Balfour, of Balfour and Trenabie, and deserves to be first considered, not only from its local position, but also from the circumstance that the operations begun in Shapinshay by Colonel

Balfour in 1848 may be regarded, in a great measure, as the *fons et origo* of the movement which has resulted in the more recent agricultural improvement of Orkney.

The island of Shapinshay contains about 7000 acres, inclusive of the adjoining islet of Ellarholm, which contains 85 acres, and is all in grass At very low tides a person may almost walk from Shapinshay to Ellarholm along a reef of rocks which connect the two islands. This holm, which rises high in the centre, serves as a shelter and breakwater to Elwick Bay, which is an exceedingly safe roadstead.

In 1848 there were exactly 700 acres—one-tenth of the entire area of the island—in cultivation. In 1859, the arable land had been increased to 5000 acres, and now it extends to over 6000 acres. In 1848 the land under cultivation was scattered in small patches of a few acres here and there all over the island; but Shapinshay now presents one continuous tract of cultivation until we reach the extreme point of the island on the east, where there is a portion of unimproved land, situated immediately behind an exposed headland. The highest part of the island is 250 feet above sea-level, from which the land slopes down on nearly all sides to the sea.

When Colonel Balfour commenced his improvements, he took the wise step of first securing the services of an experienced factor, which he did in the person of Mr Marcus Calder, who still retains the management of the property, in the improvement of which he has taken an active part. The first thing done was to lay off the entire surface of the island into squares, each containing 10 acres, the divisions being distinctly marked by open drains. The parallel lines ran through arable and unimproved lands, and were carried from one side and from each end of the island to the other. The object sought to be attained by this arrangement was systematic action, which it has fully answered. It did not matter where a man began to improve his farm; he and his neighbours all worked according to a common plan, which, when perfected, brought all their improvements together. It may be mentioned here that a similar plan of arrangement has been carried out on Colonel Balfour's estates in other parts of Orkney. The farms in Shapinshay vary from 30 acres to 200 acres in extent, as it has been Colonel Balfour's principle from the first to encourage his tenants to rise in the social scale, which he does not believe could be done if the farms were all of large extent. Hence some of his tenants, who now occupy large farms, began at first on much smaller holdings. Besides the farms referred to, there are in the island a few holdings of 5 or 10 acres, which are held by persons who are exclusively fishermen or tradesmen. In former times the people lived partly by the sea and partly by the land, and were neither fishermen nor farmers; but this is all altered, and a man must elect to be either one or the other, but not to combine both occupations in his own person. Of course, nearly every farmer in Orkney, whose place is situated near the sea, has either a boat or the share of one, in which they or their servants go fishing occasionally, but this is more a matter of amusement than of profit, or at most to obtain a supply of fish for the use of the family.

In laying off the island according to the system above described, it was always an object to join some old land with the waste which was to be improved; but this could not be accomplished in all cases, and some farms consisted wholly of new land. For old arable land the rent is about 15s. an acre; for the new land a nominal rent of 1s. was put on, but never exacted until the land became improved, when from 2s. 6d. to 3s. an acre is charged until the termination of the lease or agreement, or, say, nineteen years. Houses, draining, and other permanent improvements are erected and done either by the tenant, who receives "amelioration" for the same at the end of his lease, or by the proprietor, in which case the tenant pays interest on the outlay; but, in general, the tenants prefer the former plan. Houses and cottages must, however, be put up according to plans approved of by the proprietor; and in Shapinshay the new farm-steadings and cottages are all of a most substantial character.

When Colonel Balfour laid off the island into squares, he provided at the same time for main lines of road throughout the island, and these lines have since been completed to the extent of twelve miles of excellent roads.

The surface soil in Shapinshay is naturally of a moory character, covered with short heath, but underneath there is, for the most part, deep red clay subsoil, with which the upper soil mixes well. Much of the upper soil, however, had been skinned in former times for the purpose of mixing with dung to manure the "infield" land, as already described. The prevailing rock in the western part of the island is clay-slate, which, for the most part, lies at a considerable depth from the surface. A coarse sandstone prevails in the eastern part of the island. There is not much peaty soil, that is, deep enough to convert into peat for fuel, and this kind of land is now nearly run out. Nearly all the land has required draining, which appears to have been efficiently done with stones or pipe-tiles. In general the drains are 18 feet apart; minor drains, 33 to 36 inches deep. Where tiles are used, two-inch pipes are preferred. Main drains are 6 inches deeper than the minor drains, and the conduit has been generally built of stones, or "coupled." The draining has cost about L.7, 10s. an acre; and this statement may be regarded as descriptive of draining generally in Orkney.

The old rotation in Shapinshay was the unvarying course of oats and bear, with some potatoes, as mentioned in a former part of this report. The rotation now followed is the five-shift,—that is, the four-shift extended by an additional year in pasture.

Colonel Balfour's home-farm at Balfour Castle has been of material service in furthering the agricultural improvement not only of Shapinshay, but also of his estates in the other islands. The home-farm consists of 700 acres, most part of which is new or reclaimed land. The farm buildings are substantial and extensive, and the fields are fenced with dry-stone dykes. Colonel Balfour began twenty years ago with a stock of good cows, which had several crosses of shorthorn blood, and ever since he has kept up a succession of pure bred bulls, obtained from some of the best breeders in the kingdom. These bulls, when changed at Balfour, are sent out among the tenants in other islands; and besides this mode of introducing improved blood, he is also enabled, from possessing a number of well-bred cows, to supply his tenants and others with a valuable description of bull calves, for which prices that may be considered merely nominal are charged.

In addition to his herd of shorthorns, Colonel Balfour has also a small but very choice herd of West Highland cattle, which he keeps on an out-farm in the island. The foundation of this herd was procured from His Grace the Duke of Richmond; and amongst those I saw, it would have been easy to pick out some which would have been well placed even at a show of the Highland and Agricultural Society. In fact, bullocks bred by Colonel Balfour, and sold subsequently to Aberdeenshire feeders, have been winners at the London Christmas Shows. The calves bred at Balfour, both short-horns and Highlands, are suckled on the cows.

A constant succession of Leicester rams, from Sir George Dunbar and other leading breeders, has been kept up for the last twenty-four years by Colonel Balfour. He started originally with a cross of Leicester and Cheviot; but a large proportion of the flock has now so strong an infusion of Leicester blood, that practically it may be considered pure bred. Southdown rams have been put to ewes of the old Orkney breed, chiefly for the purpose of producing mutton for private use. The cross answers admirably for that end, being even better than the pure Southdowns, which are apt to become too fat on the grassy "holms," where the sheep bred in this way are chiefly fed. But Colonel Balfour's efforts to improve the live stock of the country have not rested with cattle and sheep. Clydesdale stallions, Yorkshire swine, and Dorking fowl, have also been introduced by him into Shapinshay with very good effect. The results may be seen in the improvement which has been made in the different classes of live stock bred by his tenants. Their cattle, which they sell when stirks of fifteen months old, range from L.10 to L.15 each in price; and their sheep have also been improved in a corresponding manner. The horses bred in the island are of a useful, punchy, active description.

Colonel Balfour keeps up a stud of fancy Shetland ponies, which was first established by his grandfather over eighty years ago. These ponies are very handsome, gentle, and easily trained. They are mostly of fancy colours, and very high prices can be obtained for any that their owner may feel inclined to part with. I believe that Her Majesty has had a pair of them. The stud stallion now in use at Balfour is a perfect beauty.

Balfour Castle has been erected on the site of the old mansion-house of Cliffdale, on the south-west part of the island, overlooking Elwick Bay, where a most commodious pier has been erected, and commanding a truly magnificent view. This noble building was erected by Colonel Balfour since he commenced his other improvements in the island, and is an imposing structure, in the old Scotch baronial style. The grounds are laid out in terraces, having "pannels" sunk in them, which afford shelter to the bedding plants; while conservatories, vineries, and peach-houses make one forget that all this exists in Orkney. Part of the grounds have been planted, and these plantations have already become a feature of the place; for although the trees on the outside of the plantations have felt the cutting force of the winds, those on the inside, and therefore sheltered, are healthy, and are growing rapidly. Large roomy schools have been built on the island, and these Mrs Balfour takes under her special care. That lady devotes her whole time to the people around her, and her endeavours to improve their condition and domestic habits have been eminently successful. Balfour village, which adjoins the Castle, and is pleasantly situated on the shore of Elwick Bay, is lighted with gas.

The rotation of crops followed in Shapinshay is now, as already stated, the ordinary five-shift course. Oats are sown from the 1st of April to the 1st of May, earlier sowing not being considered advisable. The varieties chiefly cultivated are the Sandy and early Angus, but potato-oats also succeed well. When the soil is of inferior quality, the black Murkle oat, a Caithness variety, is grown. Oats grown in Shapinshay weigh from 38 lbs. to 44 lbs. per bushel; and the produce on well-cultivated land is from 40 to 50 bushels per acre; the average produce of all kinds, and grown on all soils, being 24 to 30 bushels. The quantity of seed sown is from 4 to 5 bushels per acre, according to the nature of the land.

Of bear or bigg, the variety best liked is the "Buchan bear," which weighs from 50 lbs. to 55 lbs. per bushel. From 3 to 4 bushels of seed are sown per imperial acre. The Victoria bear has been found liable to be easily shaken, and is therefore not much grown. The Orkney bear, under improved cultivation, weighs 48 lbs. to 52 lbs. per bushel, which is fully 8 lbs. a bushel over the weight it attained under the old system of farming. Barley is not grown in Shapinshay, and very little indeed in any part of Orkney.

Wheat has been grown at Balfour home-farm and by Mr Calder at Elwickbank, which produced upwards of 40 bushels to the acre, weighing 63 lbs. per bushel. The variety grown was the Fenton wheat, and it was cultivated with success for two years, but in the third year the crop was altogether cut off early in spring, and no attempt to grow wheat has since been made. It may be mentioned, however, that Mr Calder gave some of the Shapinshay wheat to one of Colonel Balfour's tenants in the island of Stronsay, who sowed it in spring, and the result was a good crop; but while heavy crops of oats and bear are grown, and can be depended upon, it is not likely that the cultivation of wheat will ever become in Orkney anything more important than an experiment.

Potatoes usually succeed well in Orkney, and form about one-fourth of the area under green crops. Disease has been comparatively little known hitherto; but although some parts of the islands have always been free from it, yet I regret to say that this year (1872) it has latterly become unusually prevalent.

In Shapinshay, as well as in most parts of Orkney, farm manure is not applied to the potato crop, as the people have a dread that manure of that kind would be injurious to the health of the plants. The crop, however, usually turns out as productive as the average of crops of the kind in Scotland.

Orkney is a first-rate turnip-growing country, and in Shapinshay the varieties grown are the Swede, Aberdeen, and Greystone. Artificial manures of a phosphatic nature are largely used in growing turnips, along with a mixture of farmyard dung, sea-weed, and shell-sand. At one time Sunderland lime was used, at the rate of 12 bolls (72 bushels) per imperial acre, but latterly shell-sand has been substituted for it in a great measure. The shell-sand is either put out on the surface, or thrown into the court-yards, from which it comes out mixed with the dung.

Sown grasses grow luxuriantly even on new land; and certainly one of the heaviest crops I saw in 1872 was being cut, during my visit to Shapinshay in June, on Mr Calder's farm. I had previously seen the clover crops in Mid-Lothian, between Ratho and Edinburgh, and Mr Calder's crop was fully equal to the best fields in that rich district.

Some of the points referred to in the above remarks are applicable to other parts of Orkney, and will save repetition. It must not be supposed that, although matters are now in a satisfactory state in Shapinshay, it was easy to induce the people to abandon their old system of farming. In fact, they were rather inclined to look upon Colonel Balfour and his factor as their greatest enemies, when they insisted upon a rotation of crops different from the old unvarying routine of oats and bere, and when they urged the people to grow turnips and sown grasses. This feeling, however, has long passed away, and they now firmly believe that it would be an act of great tyranny were they to be compelled to return to their old course of cropping. Some years ago the tenants on Colonel Balfour's estates presented him and Mrs Balfour, and also Mr Calder, with handsome services of plate, as marks of their esteem and gratitude; but those tokens of respect only faintly express the sincere affection with which Colonel Balfour's tenants of all classes regard him and his estimable lady. He had a difficult task to pursue, but he executed it with great tact, strong good sense, and generous kindness, and now he has his reward, not only in the improved condition of his own estates and his own people, but also in having set an example which has been largely followed by other proprietors and tenant-farmers in Orkney.

Pursuing our course through the North Isles, the next place we visit is the island of Stronsay, the nearest point of which is about five miles from Shapinshay. Stronsay is about seven miles in length, and about four miles in breadth at the broadest part, but its outline is so irregular that it looks almost like three islands. It contains about 9000 acres, and its general appearance is flat. The soil is mostly a strong clay, with that rich red clay subsoil which has been already mentioned. In one part of the island a sandy soil prevails. The principal proprietors are Colonel Balfour, Mr Heddle, and the representatives of the late George Traill, Esq., M.P. The island is traversed by good roads, the benefit of which is highly appreciated, as, previous to their construction, it was frequently a matter of the greatest difficulty to pass during winter from one part of the island to another.

Landing at the north end of the island, we come first to the farm of Huip, the property of Colonel Balfour, and tenanted by Mr P. A. Calder. This farm consists of 700 acres, inclusive of two small islands or holms, which are kept in grass. The rest is all under the plough, and fully one-half of the farm has been reclaimed by the present tenant, who has been in occupation of it for the last fifteen years. The soil is mostly a light loam, and the rotation followed the ordinary five years' course. A number of the fields have been fenced with stone walls, built by the tenant; but more fencing is still required. Good crops of turnips, clover, and oats, are produced, and the soil being naturally of a grassy nature, the second year's pasture is very close in the bottom.

Large quantities of sea-weed are driven ashore at Huip, as well as other parts of Stronsay, and is made use of partly by mixing it with dung, and partly as a top-dressing for grass. A field of old grass at Huip had been top-dressed in this way in 1871, but without much effect at the time, owing, it was supposed, to the dryness of the season; but in 1872 the results were manifest in a closer and heavier growth of grass, of a deeper colour, where the sea-weed had been put on. It has been found that sea-weed answers well as a manuring for the first crop of oats grown on new land, and many prefer it to guano, or other artificial manure, for that purpose.

The breeding stock of cattle at Huip consists of twenty cows, descended chiefly from the herd at Balfour Castle. Some of the heifers show a deal of breeding, having rich colours, and are altogether very stylish animals, whilst their clean noses would satisfy even the most fastidious judge with respect to that distinctive point in a shorthorn.

Mr Calder keeps his young cattle until they are two years old, when he sells them off fat. He has also some crosses of the shorthorn bull with Shetland cows, a cross which succeeds well if it is not pushed further than the first cross. A flock of seven score of half-bred ewes is kept at Huip, and their produce is sold as lambs. The farm steading is old-fashioned, and very irregularly arranged; and although it consists of a number of houses of one kind or other, seems insufficient for the additional accommodation required since the farm was improved, and the productive area consequently increased.

The interior of Stronsay consisted formerly of a tract of the flayed moorland common in other parts of Orkney, but now it is all improved, or nearly so. There are several small lots, of from ten to thirty acres, which consist chiefly, and in many cases wholly, of improved land. These small farms are found very useful, as the families which occupy them afford a supply of labour for the larger farms. The holders of these lots are chiefly employed in kelp making during the season. There is also an intermediate class of farms in the island, ranging from L.30 to L 50 of rent, or from 70 to 120 acres in extent, which are very well managed. A considerable number of new cottages have been recently built on the island, particularly on Colonel Balfour's property. These cottages are well built, and have the walls pointed outside, which Colonel Balfour insists upon being done in such cases, and are also slated, which gives them a substantial and comfortable appearance. Generally speaking, one of the most gratifying illustrations of the improvements which have been made in Orkney of late years is the different class of cottages which is now being erected in various parts of the country; and if matters go on as they have been doing, in a few years the old style of cottages will become nearly extinct. I shall probably have occasion to make some further reference to this subject in a later portion of this report.

Situated near the south-east end of the island is the fine farm of Holland, now the property of Colonel Balfour, and of which Mr William Stevenson is tenant. The name "Holland," I may remark, is very common in Orkney; it is of Norse origin, and means "an abode on highland." Mr Stevenson's farm consists of 500 acres, the rent being L.450. It was much improved by the former proprietor, from whom Colonel Balfour purchased it recently. The soil is mostly a strong clay, except in the eastern part of the farm, where it is a light loam mixed with shell sand. Holland has been, and is at present, very highly farmed, the management being quite equal to that pursued in any part of Scotland, and heavy crops are produced upon it. The steading is large and well finished, and includes a fixed steam-engine for thrashing, &c. The stock consists chiefly of shorthorn crosses. Mr Stevenson finishes his cattle for the butcher before sending them to the market.

Adjoining Holland is the farm of Houseby, the property of the representatives of the late George Traill, Esq., M.P. This farm consists of 1200 acres, which, however, includes the island of Auskerry, containing 175 acres, all of which is sheep pasture. About 700 acres of the farm of Houseby are arable, and all the arable land has been fenced either with stone walls or with flags set on edge, a kind of fence which first originated in Caithness.

The improvement of Houseby, which a late eminent judge of land pronounced one of the finest farms in Scotland, began in 1845, when it was taken on a lease of twenty-five years by the late Mr Donald Horne, Mr Alexander D. M'Leay, and Mr Learmonth. The last-named gentleman was the resident partner, and superintended all the improvements, and at the termination of the first lease he became sole tenant.

When the first lease commenced the arable land lay in patches here and there, but it is now laid out in fields of from 24 to 54 acres in extent, all under the plough, and enclosed as described.

Owing to the want of roads and of other accommodation for the conveyance of materials, the improvement of the farm was conducted for some time under very difficult circumstances, which tended both to hinder operations and to increase the cost of improvement.

The rent of the farm, when it was taken in 1845, was L.350 per annum;* but to this must be added the interest of money expended in improvements, which rose during the currency of the lease to L.250 per annum. The annual rent under the new lease is L.800. Mr Traill allowed L.500 for drains, all other improvements being done by the tenants, valuation for the houses being allowed at the end of the lease. Since entering upon his new lease, Mr Learmonth has got L.700 from the Land Improvement Company, which he is laying out in additional draining. A new dwelling-house for the tenant, which was much needed, has been recently built.

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* The previous rent was L.200 per annum, paid in kind.

The soil is mostly a strong clay, and grows all crops which the climate will admit of, in perfection. Oats grown at Houseby weigh 44 lbs. and 45 lbs. a bushel, and bear up to 53 lbs. A person unacquainted with Orkney would suppose that beans ought to grow well at Houseby; but although field beans do grow well in Orkney, that is, so far as the production of haulm is concerned, yet they seldom pod well; but as the garden varieties are not deficient in that respect, especially when they are regularly "topped" during their growth, the deficiency in the case of field beans may arise, in the first instance, from an over-luxuriant growth of stem, and next from want of sufficient shelter.

Houseby is, however, an excellent turnip farm, and of that crop from 130 to 150 acres are cultivated each year. It may be noted here that "turnip fly" is never known in Orkney. Cold northerly winds in the early stage of the growth of the turnip plants is what Orkney farmers dread most.

When the farm was in a rough state, it was stocked chiefly with Cheviot sheep and the ordinary Orkney cattle of the day. Subsequently, Leicester rams were put to the Cheviot ewes, and half-bred tups got at Kelso are put to the half-bred ewes produced by that cross. The size of the sheep has been kept up, but Mr Learmonth appears inclined to attribute that circumstance more to the nature of the farm than the particular system of breeding. The Orkney breed of cattle was set aside in favour of the West Highland breed, of which a number of heifers were procured and put to shorthorn bulls. The produce was again crossed with the shorthorn, and so on until recently, when Mr Learmonth has again returned to the pure West Highland, which, however, he is crossing with the shorthorn. Going back occasionally to the West Highland breed invigorates the constitution of the produce. The cattle are sent off fat in the months of July and August, when two years old, and realise over L.28 each. The sheep are sold partly when lambs and partly when shearlings, after being wintered on turnips. The working stock of horses on the farm consists of nine pair. Altogether, Houseby is an admirable illustration of successful improvement, and also of general good management; and there is little doubt that, if it had been more favourably situated, it would have been well known, long ere this time, as a crack Scotch farm.

Rousholm, which forms a separate leg or section of Stronsay, consists chiefly of sandy soil, and does not call for any special mention, beyond noticing the fact, that turnips grown on light sandy and peaty soils in some parts of Orkney appear to lose all their nutritive value by the end of January, after which date cattle fed upon them do not improve. Hence, people so situated as to possess much of that sandy land are always desirous to get what they call "mouldy ground," that is, land of a stronger description. Whether rape would answer in some measure as a substitute for turnips in such cases remains to be seen, as it is a crop which is not much grown in Orkney. In some instances, rape has been grown to afford a supply of early keep for ewes and lambs; but it occurs to me that it would be a good crop to grow on new land as the first crop, inasmuch as it would grow on the rough surface, with the help of some artificial manure, while the treading of the sheep in eating down the crop would be of advantage to the land and help to rot the tough sods.

Returning by the north-east side of the island, we notice the nice-lying farm of Huntown, which belongs to Colonel Balfour, and is tenanted by Mr Hume. This farm consists of 300 acres, 200 of which have been reclaimed by the tenant, who has also drained any part of the land which required draining, the main ditches being made at the landlord's expense, who has laid out over L.800 in this way in Stronsay. Mr Hume has made some considerable additions to his steading, and he has also enclosed a considerable part of the farm with stone fences. The neatly kept garden in front of the farm house, and the walls covered with ivy and other climbing plants, form an attractive feature at Huntown.

Whitehall is another very fine farm. It consists of about 400 acres of a sharp, brown, loamy soil. The Whitehall fishing station and village is situated on this farm, and also the quay, at which the steamboat calls twice in the course of each voyage, to and from Kirkwall, through the North Isles. At one period a very large number of boats were employed at Whitehall in the herring fishery during the season, but of late years this branch of industry has fallen off. Whitehall, however, possesses many advantages as a fishing station, amongst which is a safe and well-sheltered roadstead, and it may yet become a more important place in that respect.

From this point we pass over to the island of Sanday, which lies about four miles north from Stronsay. This island is fully twelve miles in length, taking the distances from one extreme point to the other, but it is so indented by the sea that it is almost cut into three portions, varying from little more than a mile to nearly five miles in breadth, and looking, as represented on the map, like one of those huge pre-Adamite animals which are figured in geological works. The northern divisions of the island are flat; but towards the south the land rises into a ridge, the summit of which is from 200 to 300 feet above the sea. A large portion of the island consists of a sandy soil, some of which is blowing sand. The land contains large quantities of the remains of shells, in a very minute state of division, and some specimens of the sand which have been analysed were found to contain as much as 95 per cent. of carbonate of lime. The great extent of sandy soil in the island is very favourable to the breeding of wild rabbits, of which there are large numbers, although they may not now be quite so numerous as they were at one time. In some parts of the island the soil consists of a fine clay loam, and in one locality there is a tract of bare-looking, thin, moory land; but the general appearance of the island is green and fertile. There is no peat in Sanday.

At the south point of the island is the farm of Stove, situated at the head of a bay of the same name. This farm was formerly the property of the Laing family, but is now part of the Sanday estates, belonging to Colonel Balfour. It was on this farm chiefly that Mr Malcolm Laing, in 1808, kept a flock of merinos, of which mention has been made in a former part of this report. The farm, which is now held by Messrs Irving and Hourston, as joint-tenants, consists of 1050 acres, 640 of which are arable, the remainder being good sheep pasture. The rent is L.400, rising to L.450, and finally to L.500, in the course of the lease; the tenants, however, having the option to renounce the lease, if so inclined, at three "breaks." A considerable proportion of the farm consists of a good clay loam, resting on red clay subsoil. It lies well for aspect and shelter, and the arable land is well farmed on the five-shift course. On visiting Stove, I found 90 head of cattle of different ages, all grazing together in a large field of very superior second year's grass, and 30 two-year-olds had been sold a short time previous. These cattle were all shorthorn crosses. The flock consists of about 700 Cheviot or halfbred sheep. A large and commodious steading was built at Stove some years ago, which includes, among other improvements, a fixed steam-engine, and one of Clayton and Shuttleworth's best thrashing-machines. The farm was much improved by Mr Kinnear, from whom Colonel Balfour purchased it, and the present proprietor has since expended over L.1700 in further improvements.

Immediately adjoining the farm of Stove, but on the north side of the limb of the island in which it is situated, is the townland of Braeswick, which deserves notice from the system which has been carried out upon it by Colonel Balfour. Part of this townland was formerly a "mortification" or bequest invested in the minister and kirk-session of the parish of Cross, for behoof of such persons as might have served for a period of thirty years on the farm of Stove, failing whom the rents were to be administered for behoof of the poor of the parish, with a preference in favour of any who might have been farm-servants at Stove. As the "mortified" or bequeathed lands, which were valued twenty-five years ago at about L.21 per annum, lay intermixed with other portions of Colonel Balfour's property, he arranged with the trustees for an exchange, giving an equivalent in land adjoining the church and glebe of the parish. When the exchange was effected, the entire townland was squared off into lots containing from 16 to 20 acres each, abolishing the system of runrig which previously prevailed. A new road was made right through the townland, and the lots were laid off so that there should be a part of each lot on both sides of the road. It was laid down as a rule, that the houses should be built on the north side of the road, so as to face the sun, and that they should be of a uniform description, and situated at a specified distance back from the road, so as to have a plot of garden ground in front of each cottage. The cottages, with their accompanying offices, are neat and substantial, and have been built by each tenant on his own lot. The windows of several of these cottages were filled with geraniums, fuschias, and other flowering plants, forming a marked contrast to the dingy dwellings which formerly existed in the same place, and of which some specimens are still to be seen in the neighbourhood. These little farms are now all improved, and cultivated under the five years' rotation. It was the intention of the proprietor that the Braeswick cottars should employ themselves in kelp-making, but of late years they are becoming somewhat careless about the kelp manufacture, as they find that the price of a cross-bred year-old bullock much more than pays their rent, and their small farms being productive, they are left very comfortable, without the drudgery of gathering sea-weed and burning it. Their families can always find constant employment on the large farms in the neighbourhood. Part of the townland was formerly a swamp, famous for snipe shooting. Some of the sandy soils in the neighbourhood possess the peculiar feature that cattle cannot live on them more than two years, and must either be sold or changed to other land before that time has elapsed.

Proceeding northwards through the island the next farm of importance is Warsetter, belonging to Colonel Balfour, and occupied by Mr John M'Kay, who has succeeded his father and grandfather as tenant on the Balfour estates. The extent of this farm is about 450 acres, and it consists mostly of a sandy soil with a proportion of clayey loam. The farm produces good crops of black Murkle oats, bear, potatoes, and turnips. The black Murkle is the variety of oat which is chiefly cultivated in the island, and it may be here stated that the general produce throughout Sanday on well-farmed land is as follows:—Oats, 4 quarters per acre, weighing 40 to 42 lbs. per bushel; bear, 5 quarters per acre, weighing from 48 to 52 lbs. per bushel, and even higher. Mr M'Kay prefers sheep as the principal stock on his farm, and he is, therefore, laying some of the lightest parts of the land down as permanent pasture. His flock consists of Cheviot ewes, which are put to Leicester tups, and the lambs are sold when weaned. He also keeps a number of cows with their produce until the latter are two years old. The cattle are shorthorn crosses, but last year, finding that his cattle were getting too fine, he introduced a Highland bull, with the intention of putting the heifers of this cross to a shorthorn bull. A considerable part of the farm has been fenced with excellent stone dykes at the expense of the tenant, and he has also built a very comfortable dwelling-house and good farm offices, for which he will, of course, be allowed "ameliorations" at the termination of his lease.

Still holding northwards, along the excellent road which has been made in the island, we pass the farm of Backaskaill, the property of the Earl of Zetland, and occupied by Mr John Paul. A first-rate farm steading has been erected on this farm by the proprietor. Backaskaill consists of about 400 acres, a considerable portion of which is a sandy soil, and a piece of grass land or "links" along the shore is a complete rabbit warren. The upper part of the farm forms a portion of the hilly ridge of which mention has been made, and there the land is more of a moory nature, having the underlying slate rock coming near the surface. It is, however, a rotten rock, which yields rapidly to the influence of the weather on being exposed to the air. Mr Paul has improved a large extent of the hilly part of the land, and when his improvements are completed, Backaskaill will make an excellent sheep farm.

On the north side of the Bay of Backaskaill is the nice-lying farm of How, belonging to the estate of Westove, the property of Captain Harwood. It may be remarked that "how" in Orcadian nomenclature signifies the very opposite of the Scotch word "*howe*," or hollow. The Orcadian "how" is of Norse derivation, and signifies "an habitation on an elevated ground, or on a hill with a gentle declivity," which exactly describes the position of the farm of How in Sanday. This farm is also about 400 acres in extent, and consists for the most part of land of superior quality, which if well cultivated would render it one of the best farms in Orkney. On the opposite side of the bay to the north of How is a curious promontory, forming the farm of Elsness, which is part of the Orkney estates of the late Mr George Traill, M.P. The bay formed by the promontory of How or Beanness on the south, and of Elsness on the north, is called

Kettletoft Bay, and is the principal port of the island. A harbour was built a few years ago on the south side of the bay, at considerable expense, but it is not suitable for the large trade which is carried on. It is to be hoped, therefore, that the proprietors of land in Sanday will take advantage of the recently passed Orkney Piers and Harbours Act, and so get the harbour extended and improved.

A short distance from the harbour at Kettletoft is Geramont, formerly the property of Mr Urquhart, who built a large mansion-house with corresponding offices upon it, and enclosed 100 acres as a park, which he afterwards improved. Geramont is now part of the property belonging to the representatives of the late George Traill, Esq., and along with the adjoining farm of Hammerbrake is now in their immediate possession. The land, although apparently but of middling quality, bears good crops, being very well farmed. Both places are fenced with stone dykes.

At this point we reach that part of Sanday where the Bay of Otterswick divides the northern part of the island into two limbs. In the western of those divisions, at the junction of the parishes of Cross and Burness, is the fine farm of West Brough, belonging to Colonel Balfour, and tenanted by Messrs Jerome and Walter Dennison, who are now running their second lease of nineteen years. This farm consists of 360 acres, a part of which is outrun for sheep. It is nearly all fenced with stone dykes, and the tenants have built a dwelling-house on the farm, equal to anything of the kind in Scotland. There is also a good steading, which is nearly all new. The arable land of the farm has all been improved, and the management generally is of the highest description. The crops were excellent, and the grass, including second year's pasture, was most luxuriant. The Messrs Dennison keep a large herd of shorthorn crosses, some of which show a great deal of breeding. Some wonderfully thick cows are descended from polled stock, and it was interesting to observe, in the case of these cows, the tendency evinced to breed back to the original stock; as notwithstanding several crosses had intervened since the polled blood was first allied with the shorthorn, yet in several instances the cattle had the true head, with its characteristic tuft, of the polled breeds. Messrs Dennison do not breed sheep, but purchase about 400 cross lambs each year, which they winter on turnips, and sell out after taking the fleece. Their young cattle are sold fat when two years old.

Three or four stacks of last year's (1871) crop standing in the stackyard at West Brough leads me to say a few words relative to the harvesting of crops in Orkney. For the most, the crop when cut is put up in small stacks, locally termed "skrews." These contain from 24 to 48 sheaves, according to size. The sheaves are gathered in a circle round the site of the intended "skrew." A man then commences as if beginning a common round stack, the sheaves being handed to him by a woman. If the sheaves are large and long, he has to make the "skrew" larger than when the sheaves are small and short. The sheaves are put together so as to form a conical rick from 7 to 8 feet in height, the "skrew" being closed on the top by means of two sheaves spread out above and below, so as to run off the rain. The skrew is very useful in wet harvests. The name "skrew" continues to be applied to the ricks or stacks even after the crop has been carried and built up in the stackyard. In the case of the large or stackyard skrews, the shank, or lower part, swells out very gradually from the foundation until a height of 6 or 8 feet is reached, when the courses are taken in without any perceptible "easing" or defined eave. This in-taking is pursued until the skrew is brought to a rounded apex; the shape when finished being exactly like that of an egg, with a little bit off the thick end. Little thatch is required, but the head is firmly secured by straw ropes, or "simmons" as these are locally designated —the ropes being placed close together, running over the crown, and fastened beneath the point where the head begins to be taken in. These skrews stand gales of wind much better than the form of corn-stacks common in other parts of Scotland.

The stackyard at West Brough consists of a huge mound of artificial origin. A mound of the same kind exists at How, and also at other parts of the island. On cutting into one of these mounds it is found to consist of a mass of black soil, intermixed with layers of ashes; and the explanation given of their formation is, that they consist of the accumulated farmyard manure and house refuse of many generations of inhabitants. This may appear strange, but it is nevertheless a fact. Farmyard dung was considered so inferior to sea-weed as manure, that no one used it, and it was either allowed to accumulate in heaps, or carried to some convenient place, where it could be put into the sea. Nor were such practices events of a remote date, for it is within the recollection of living men, that the tenants in some parts of Sanday were bound to clear out the laird's dung-courts once a year, and carry the stuff to the sea-beach, where it was washed away by the tide. Mr Jerome Dennison stated that he remembered when his father would give any one who applied to him as much farmyard dung as they pleased to take away; and one farm in the island was considered to possess great advantages from the circumstance that the dung could be thrown at once out of the byres into the sea. Mr Robert Scarth corroborates this in his account of the parishes of Cross and Burness, published in the last "Statistical Account of Scotland" (1842), and further states that "he has witnessed the wilful burning of the straw from which forty bolls of grain had been thrashed." The material got in the mounds to which reference has been made forms an excellent compost with sea-weed, and answers admirably when put upon light sandy soils.

It has been mentioned that Sanday is destitute of peat. Large quantities of coal are therefore imported, but in former times the fuel chiefly used was composed of cow-dung made into "bannocks," and dried in the sun. This description of fuel emitted in burning a peculiar odour, which was communicated to the clothes of the people, and those who used it were therefore easily recognised by the smell of their garments. The employment of cow-dung as fuel is now nearly abandoned, unless among some poor people, but it is still followed to some extent in the adjoining island of North Ronaldshay, which, like Sanday, is totally destitute of peat.

Near West Brough is the schoolhouse belonging to the united parishes of Cross and Burness. Mr Miller, the schoolmaster, is an enthusiastic horticulturist and floriculturist, and has succeeded in creating a well-kept and nicely stocked garden out of a bare bit of ground lying close to the sea. One part of Mr Miller's garden is a perfect wilderness of fuschias, which thrive well in Orkney, and altogether it is something one would scarcely expect to see in such a situation. Some may consider this a matter of little importance, but it shows in its own way the progress which has taken place in Orkney since the time when "southern-wood," "gardener's garters," "honesty," and a few other hardy plants, formed the sole floral decorations of an Orkney garden.

The road leading northwards passes through the estate of Westove, which has recently been purchased by Captain Harwood. At Scar House, the residence of Mr James Scarth, factor on the Westove and other estates in the North Isles, there is a modernised steading, with a steam-engine, which drives the machinery of a meal-mill, as well as the thrashing machine, &c. Sanday is destitute of water-power; and formerly there were a number of windmills in the island, which at a distance from the shore looked as if they rose out of the sea, owing to the flatness of the land in that part of the island in which they were chiefly situated. Only one of these windmills is now in existence. A good deal of the land in this part of the island is thin and poor, but about Scar there is a tract of fine kindly soil.

The road in the eastern limb of the island runs to the Start Point lighthouse, through the farms of Newark, Cleat, and Lopness, all of which are situated in Lady Parish. Cleat—of which the old Norse meaning is "a house in a conspicuous point of view"—and Newark are on the property which belonged to the late Mr George Traill, M.P.; Lopness belongs to Lord Zetland. The farm of Cleat contains over 400 acres. The soil is mostly sandy, but there is also a considerable proportion of it fine loamy land. The tenant, Mr James Sinclair, and his family, farm the land very fairly. They breed shorthorn crosses, but do not fatten any cattle. Newark is also about 400 acres in extent, and there is more land of a light sandy nature in it than in the farm of Cleat. The tenants, Messrs Thomson, grow good crops, especially potatoes, for the production of which the farm has long been celebrated, and they have also a large stock of well-bred cattle. Lopness consists of 150 acres of light sandy soil. The tenant, Mr Harvey, has only been a short time in possession of the farm, and it is likely to be improved very much under his management. Large quantities of sea-weed are annually cast ashore at this part of Sanday, and it is used chiefly as manure for the potato crop. The average rent of arable land in Sanday is from 10s. to 12s., and of the best class of arable land from 18s. to 20s. per acre. Harvest begins in Sanday, as in most parts of Orkney, about the first week in September, and concludes in ordinary seasons about the middle of October. In 1872, harvest began in some parts of Orkney on the 19th of August, as reported in the local papers of that date, and in 1873, on the 11th of the same month.

The island of North Ronaldshay is the most northern of the Orkney group, and lies about three miles from Sanday, from which it is separated by a dangerous firth. It contains about four square miles, and its general appearance is flat, with a gentle rise in the middle. The whole island is the property of Dr Traill of Woodwick. The arable part of the island, or about three-fourths of its area, is enclosed by a high dyke, leaving a strip of waste ground all around, next the sea. To this strip the sheep of the island, which are of the small original breed previously mentioned, are confined, their food consisting chiefly of the sea-weed which is drifted ashore in large quantities. These sheep are kept chiefly for their wool, which is very fine, but small in quantity. In 1832 Mr Robert Scarth, who was factor for the proprietor, introduced a new system of management into North Ronaldshay. He abolished all "kains" and services, and payment of rents in kind; squared and laid off the runrig lands of the tenants; improved their houses; and allowed one-half of the new money rent to be laid out by the tenants in well-planned drainage and enclosures. He gave twenty-one years' leases; a return of half the rent being made for ascertained improvements effected during the first seven years, and a rise of rent, limited to 3s. in the L., or 15 per cent., being added at the commencement of the second, and again at the commencement of the third seven years. The rents were fixed at so much per acre, from 1s. up to 20s., according to the quality of the land. Mr Scarth also introduced carts, improved ploughs, Highland bulls, and a better class of horses, into the island. These improvements were not effected without having to encounter much prejudice, and also having to overcome a great deal of awkwardness on the part of the people at the first start; but the system proved so successful that Mr Scarth afterwards extended it to other estates under his charge in different parts of Orkney. Nor has the improvement been confined to the land, for it has extended also to the people, infusing an amount of energy into them which they did not possess under the old system, and leading them to materially improve their social position. The inhabitants are very primitive in their habits, and strongly attached to their native island, notwithstanding its remoteness and the little intercourse they have with other places. Of late years shorthorn bulls have been introduced into North Ronaldshay.

We now pass on to the island of Westray, which, with its satellite, Papa-Westray, is situated in the extreme north-west portion of the Orkney group. Like most of the other islands, Westray is of irregular shape, the breadth from sea to sea varying from five miles to about half a mile, while the length between the extreme points is about ten miles. With the exception of Fitty Hill, which rises to 541 feet above sea level, and a short range of hills connected with it, the island is mostly low lying. In different parts of the island, and especially in the northern portion, the soil is light and sandy, but in other parts it consists of a good loam.

Pierowall, the capital of Westray, is a fishing station of considerable importance, situated in the north-east part of the island. It forms the furthest point in the bi-weekly voyages of the North Isles steamer. It is situated on Colonel Balfour's Trenabie estate, and has been much improved of late years, while the land around it has been all squared and put in good order. An important improvement effected in Westray consists in the excellent roads which have been constructed through the island. As there was no place at Pierowall for the steamer to go alongside, Colonel Balfour has commenced to build a pier on his side of the bay, which is well sheltered, and has the advantage of deep water.

Aikerness is the most northerly farm in the island of any importance. It belongs to Lord Zetland, and is occupied by Mr Hewieson. It contains about 300 acres of sandy loam. The farm management is systematically conducted, and of late years several useful additions have been made to the farm-steading by the proprietor. The farm of Trenabie, from which Colonel Balfour, the proprietor, derives one of his territorial titles, consists of 200 acres, and is let to two widows, Mrs David Scott and Mrs John Scott. The soil is a sandy loam. The farm has been squared, subdivided, and partially enclosed. A new steading has been erected, and it is worthy of notice that the water-power which drives the thrashing machinery on this farm is chiefly supplied by the Atlantic Ocean, the dam being filled by water driven over the rocks during heavy gales. The farm of Noltland, which also belongs to Colonel Balfour, consists of 170 acres of sandy loam, and is held by Mr Robert Rendall, who farms it fairly. The ruins of the ancient castle of Noltland, of which an account is given in Billings' "Baronial and Ecclesiastical Antiquities," stand on this farm, and the scenery about it is very beautiful. The farm of Noup lies to the north-west of Noltland. It consists of 200 acres, and the soil is chiefly a clay loam. Noup-Head, a bold promontory facing the west, forms part of the farm, and would suit black-faced sheep, but at present it only grazes a few native crosses, and a mixed stock of cattle and horses taken in for the summer. At all the places mentioned there is a great supply of sea-weed, which the people apply as manure to their land, and also convert into kelp. On the south of Pierowall, and also on the north of that place there are a number of small farms, belonging to Colonel Balfour, ranging in extent from 20 to 40 acres, and rented at from L.8 to L.20, which are well farmed, and upon which some very handsome cottages have been erected. The improvement of this class of occupants is a matter which possesses much interest, considering the miserable condition in which they lived previous to the introduction of the new system of estate and farm management.

The fine farm of Brough belongs to Thomas Traill, Esq. of Holland, who is a keen improver of land, and a first-rate farmer. The farm consists of about 400 acres, and the soil is a black loam on a clay subsoil. A large mansion-house was built a considerable time ago by the father of the present proprietor; and a commodious farm-steading has recently been added to meet the requirements of modern agriculture. The farm has been well laid off, fenced, and opened up by suitable roads. The management is in accordance with the most advanced Scotch farming of the day, and is conducted by the proprietor, who holds Brough and the adjoining farm of Gallowhill in his own hands. The last-named farm has been recently improved out of what was formerly commonty land. The soil is a heavy clay loam, which gives good crops under Mr Traill's high farming. A new steading has also been put up on this farm. Adjoining Gallowhill is an excellent sheep run, which Mr Traill has stocked with Cheviot ewes, and these he crosses with Leicester tups.

Still pursuing a southerly course through the island, we come to the farm of Cleat, which is part of the estate of ——— Stewart, Esq., and has been recently let to Mr Cumming. The soil is mostly a heavy clay loam, which produces large crops of grain, grass, &c. Cleat is about 300 acres in extent, and has been very much improved by the proprietor. There is a good steading upon it, and it is all sub-divided and enclosed with substantial stone fences. Fribo, which lies in the centre of the island, belongs to Mr George Brotchie, who has it in his own hands. The soil is an excellent clay loam, and is kept in a high state of cultivation. A good mansion and farm-steading has been erected by the proprietor, who is also, like many Orcadians, an enthusiastic floriculturist, and has a large collection of rare plants. At the farm of Clifton, belonging to Mr Traill of Holland, a new steading has been put up, and a considerable extent of ditching and draining done by the proprietor. On the south-west side of the island is the fine farm of Twoquoy, which belongs to Dr Omond of Tirlot. It is 250 acres in extent, and an excellent steading, with first-class machinery, has been recently erected upon it. The bear grown on this farm in 1871 weighed 54 lbs. per bushel.

The late Rev. John Armit, in his statistical account of the island (1841), said that "it is only the smallest kind of sheep that thrives in Westray, and the same observation holds in regard to cows. The larger cows do not take well with the bare pastures of Westray. In a few years they degenerate into little more than the common breed of the place." Mr Armit attributed the tendency to degenerate to the backward state of agriculture in the island at the time he wrote, and subsequent experience has proved that he was correct. Since the commons were divided, the farms properly squared off and fenced, admitting of the cultivation of green crops and a proper rotation being carried out, the cattle and sheep bred in Westray have become quite equal, in most instances, to the same kinds of stock bred in other parts of Orkney. The cattle are chiefly shorthorn crosses, and come out heavy in the hands of Mr Traill and others. The sheep are crosses of the Leicester ram with the Cheviot ewe, and every small farmer has got some sheep, which are grazed along with the cattle. Pigs are also bred and reared in considerable numbers.

Papa-Westray has been mentioned above as the satellite of Westray. It is situated at a distance of between two and three miles from Westray, and is of an oval form, about three and a half miles in length by a mile in breadth. The prefix *Papa* is supposed to be derived from the island having been one of the residences of the ancient Irish monks or "fathers," and there exist families in Westray to this day of the name of Keldie, which is supposed to be a corruption of the word Culdee. A well in Shapinshay also, which now supplies Balfour Castle with water, is known as "Culdee's Well." The prefix Papa is attached to other islands in Orkney, such as Papa-Stronsay, &c.

Papa-Westray belongs to Mr Traill, whose family mansion of

Holland is situated in the island. It is one of the most fertile of the Orkney groups, and its natural fertility has been vastly increased by the operations of the late, as well as of the present, proprietor, who has a large portion of the island in his own hands. The soil is chiefly a sandy loam, in which white clover and the perennial red clover grow naturally with great luxuriance. It may be noticed, with reference to the perennial red clover or natural "cow-grass," which grows so luxuriantly in many parts of Orkney, that cattle like it very well in the early part of the season before it gets into flower; but once the flowers appear, cattle will not touch it, and will eat any other grass in preference to it; but if the clover is cut and allowed to lie for some hours, they will then eat it. This seems to prove that there is some difference between the wild cow-grass and the cultivated variety. The crops of turnips produced in Papa-Westray have long been noted for their excellence. Mr Traill pursues in Papa-Westray the same system of high farming which he carries out on all the lands in his own management in other parts of his estates. A large steading has been put up at Holland House, chiefly by the present proprietor. There is a considerable number of small crofters in the island, whose holdings range from five to fifty acres in extent. They have the use of a good outrun for their sheep and cattle, and from the kindness with which they have been treated, not only by the present proprietor, but also by his father, they are in very comfortable circumstances. Peat does not now exist in Papa-Westray, and as the mosses which formerly existed in Westray have also been exhausted, the inhabitants of both islands have to resort to the adjoining island of Eday for any supplies of peat they may require.

The island of Eday lies between Westray and Sanday, about two and a half miles from the former and a mile and a half from the latter, taking the nearest points. It is long and narrow, being nearly eight miles in length, while the breadth varies from half a mile to two miles. Eday belongs to Robert James Hebden, Esq., who purchased it some years ago from the trustees of the late Mr Samuel Laing. A ridge of high land runs from north to south of the island, and the land which lies along the sea on the east and south parts of the island is fertile, but the most part of Eday is a deep peat covered with heath. On the north-east of the island, and separated from it by the beautiful and safe harbour of Calf Sound, is a large holm, called the Calf of Eday, which consists of excellent sheep pasture. Mr Hebden has introduced sheep farming on a large scale into Eday, with much success. His flock is composed of Cheviots, which thrive well on the island. He has also improved a large extent of land around his residence at Carrick, in the north-east part of the island, where he has built an extensive and commodious steading, with water-power for the machinery. The land in the possession of the small tenants has been squared and laid off in separate farms, and improvement to some extent introduced among them. Mr George Davidson, who holds the farm of Greentoft, in the south end of the island, is the principal tenant on the estate, having 300 acres of arable land, with an extensive outrun for sheep. Some years ago both Eday and the Calf were largely stocked with grouse, but, in spite of strict preservation, the birds have greatly diminished in numbers of late, while rabbits have increased enormously on both places, and large numbers are exported during the season to Aberdeen and Edinburgh.

The next of the North Isles of importance is Rousay, which lies to the west of Eday, and is separated from Pomona, or the Mainland, by a narrow strait. The principal proprietor in Rousay is Colonel Burroughs, late of the 93d Regiment. Mr Craigie, who is the representative of an ancient Orkney family, also owns part of the island. Rousay is the most hilly island in Orkney, with the exception of Hoy. The hills rise from the sea in a succession of terraces, over which the mountain streams, as at Westness, pour in a series of cascades. The arable land is confined to a strip which runs round most part of the island, the interior consisting of hills suitable for blackfaced sheep, Highland cattle, and black game. Rousay is, in fact, the best grouse island in Orkney. The total extent of the island is about 12,000 acres. Part of the hill ground in Colonel Burroughs' possession has been stocked with Cheviot sheep, the breed of which is kept pure, but Leicester rams are put to the old ewes, and a cross of half-bred lambs taken, which are reared on the Colonel's farm at Westness. The summer stock of sheep belonging to Colonel Burroughs is about 1200 in number, which is reduced before winter to 700, by the sale of half-bred lambs, old ewes, and Cheviot dinmonts. The farm of Westness contains about 200 acres of arable land, and is beautifully situated, facing the south, with a high range of hills behind. The farm is managed for the proprietor by Mr Learmonth, a brother of the tenant of Houseby in Stronsay, and the system pursued is the five-shift course, the crops raised being very superior. A large steading is situated close by the sea, and abundance of water-power is supplied by the mountain stream above mentioned. Besides the stock of ewes and half-bred lambs, the farm carries 60 capital shorthorn crosses of different ages. The old mansion-house of Westness is surrounded by large gardens and shrubberies, which impart a very pleasant look to the place, but Colonel Burroughs is about to build a new mansion in another part of the island, as his own residence, from designs by Mr David Bryce, who was the architect of Balfour Castle. There is an excellent road all round the island, but the people chiefly use the sea as their highway. The holdings occupied by the tenants in Rousay range from L.2 to L.80 a year of rent. Their mode of cultivation is improving, and more money is now got for the eggs and bacon exported from Rousay in the course of a year than was obtained for all the produce exported in a similar period twenty years ago. The system of sheep breeding introduced by Colonel Burroughs is capable of being much extended in the island.

The island of Egilshay lies to the east of Rousay, and is about three miles in length by a mile and a half in breadth. The proprietor is Dr Baikie of Tankerness. It is all let to small tenants, whose farming is not so advanced as in other parts of the country. Bulls of shorthorn blood have been introduced, but the cattle bred on the island are inferior. Egilshay contains some ancient ecclesiastical ruins, which carry us back to the introduction of Christianity into Orkney,—namely, a small Gothic church, dedicated to St Magnus, the patron saint of Orkney, and a round tower, similar to those which are found in many parts of Ireland. The small island of Wyre is situated on the south side of Rousay. Wyre was one of the places into which Mr Robert Scarth introduced the improvements which he first tried in North Ronaldshay, as described in the account given above of that island. Gairsay lies between Wyre and Shapinshay, and contains about 700 acres. It rises in a conical form from the sea, the arable land being situated round the shores. Gairsay belongs to Colonel Balfour, and the fine appearance of the crops afforded evidence of the satisfactory system of farming pursued by the tenants. Gairsay would make a capital sheep farm, as it would carry half-bred sheep, and leave plenty of room to grow turnips, &c., for them.

With Gairsay we complete the round of that part of Orkney known as the North Isles.

A glance at the map of Orkney will show that the point where the town of Kirkwall stands, the Mainland, is rendered very narrow in breadth by Kirkwall Bay on the north and Scapa Bay on the south, which approach so closely that there is barely two miles between them. That portion of Pomona which lies to the west of the isthmus is locally known as the "West Mainland," while that on the east is the "East Mainland." The former is the largest portion of the island, and we shall therefore now turn our attention to it.

The West Mainland.—Leaving Kirkwall by an excellent road, which runs in a south-westerly direction, several well-improved farms are passed. About seven miles from Kirkwall, in the parish of Orphir, is the estate of Swanbister, the property of Archer Fortescue, Esq., a Devonshire gentleman, who purchased the estate in 1845, and has ever since that time been one of the leading improvers of land in Orkney. Mr Fortescue's first purchase consisted of a block of 1700 acres, for which he paid L.3500, and to this he soon after added 1300 acres adjoining his first purchase, the price of which was L.2400. At that time there was neither a road nor an enclosure on the property, and the whole extent of arable land did not exceed 150 acres, scattered here and there in small patches of from half an acre to perhaps three acres in extent. On getting possession, Mr Fortescue took the stock and crop belonging to the former proprietor at valuation, and when it is stated that the valuation amounted only to L.81, 10s., some idea may be formed regarding the condition of the place at that time. As a contrast to this, it may be mentioned that the value of the stock and crops at Swanbister in 1872 was estimated at about L.4000; that is, on the lands immediately in Mr Fortescue's possession. Part of the property consists of hill ground, rising to a considerable elevation above the sea.

At the time when Mr Fortescue commenced operations at Swanbister, no turnips or artificial grasses were grown upon the estate; the tenants held their lands on the runrig system, the course of cropping being oats, potatoes, and bear, in succession; and as was usual at that time in Orkney, after harvest all cattle, sheep, horses, swine, and geese, roamed at large over the arable lands. One of the first things Mr Fortescue did was to put a stop to this system, and to give every tenant a square of land close to his house. Each square was divided into five or six equal parts, which enabled the tenants to get into a regular system of cropping—a point which Mr Fortescue insisted upon, very much against the wishes of the people. Considerable difficulty was also experienced at first in getting them to herd their cattle, &c., so as to prevent from trespass; and when the cattle so trespassing were poinded, and poind money taken for them, they thought it "hard lines," and for some years the name by which their laird was best known among them was "the Devil of the Hills." That feeling has, however, long ceased to exist, and now they do not hesitate to say that it was a lucky day for them when Mr Fortescue became proprietor of Swanbister, for the tenants are now far better off than they were under the old system, and each acre they have yields twice as much as it formerly did.

Mr Fortescue commenced his improvements in 1846, including road-making, draining, fencing, and building farm-offices. The greater portion of the land so improved was that of which mention has previously been made—namely, land from which the surface had been pared and carried away. This land was first thoroughly drained 18 to 20 feet apart, and 3½ to 4 feet deep, and then ploughed and exposed to the winter's frost. Next spring it got another furrow, and was then sown with oats, 3 to 4 cwt. of Peruvian guano being applied at the same time to each acre. After harvest, the land was ploughed deeply with a large plough drawn by four horses. The next crop was turnips, manured with 20 tons of town dung and 5 bushels of bones to each acre. After the turnips were removed, sea-weed was carted on to the land, at the rate of 15 loads to the acre, and ploughed down. Lime at the rate of 8 to 12 bolls, or 48 to 72 bushels, per acre, according to the nature of the soil, was then harrowed in, and the land sown down with oats and grass seeds. The town dung used was obtained chiefly in Stromness and partly in Kirkwall, and fully 3000 tons of it were conveyed in boats from Stromness to Swanbister during the first ten years. Men were also employed with nets to catch dog-fish to be converted into manure during summer, and vast quantities of the small fish called "sillocks," which abound in Orkney during the winter, were also caught and mixed with earth, the dog-fish being prepared for use in the same manner. Beginning in this way, and following up the preliminary steps in an equally liberal manner, it will readily be supposed that Mr Fortescue has brought the arable land at Swanbister into a high state of cultivation. The arable land is about 450 acres, of which 100 acres are divided into small holdings for the cottars who were upon the estate when Mr Fortescue purchased it. The remainder, say 350 acres, with 80 acres of salt-marsh, reclaimed from the sea, the proprietor has in his own hands, and it is divided into fields of from 12 to 25 acres, and fenced with stone dykes 4½ feet high. The average produce of oats grown on the farm is fully 40 bushels per acre, which weighs from 41 to 43½ lbs. per bushel. The weight of turnips grown per acre is from 20 to 25 tons. Mr Fortescue has erected several very substantial and handsome cottages for his labourers, which he gives them rent free. A small but thriving plantation in a hollow near the mansion-house—which was erected by Mr Fortescue—makes one regret that he has not extended his planting operations a little further.

Mr Fortescue stated to me that he had experienced a great check in carrying on the improvement of land from the nature of the existing law regulating the valuing and assessing of recently improved waste land. The last twenty acres he reclaimed, by trenching, draining, and fencing, at a cost of L.20 an acre, were valued while the first crop was growing on it at the rate of 19s. an acre, and he had to pay the assessment on that amount, being nearly 3s. 6d. in the L., before he had sold the first crop. This system of valuing newly reclaimed land vastly reduces the return for money expended. A certain number of years ought to be allowed before a valuation and assessment is made in the case of newly reclaimed land, so as to allow the improver to have some time to recoup himself for the capital expended; and there is certainly much room for the objection, that under the present system the improving proprietor is taxed to make up the deficiency caused by the non-improving owners of land.

It has been stated that a considerable part of Mr Fortescue's property is hill ground, and upon it he keeps a flock of Cheviot sheep. The hill ground has been all surface drained. The flock consists of 640 breeding ewes and 150 ewe hoggs. About 300 of the oldest ewes are put each year to Leicester rams, the younger ewes being run with Cheviot rams. In September the lambs are all sent to Kingcausie, in Kincardineshire, where they are wintered, the half-bred lambs being fed off on turnips, while the Cheviot ewe hoggs return to Swanbister in April. The sheep are carried to and from Aberdeen in a fast-sailing sloop belonging to Mr Fortescue.

The stock of cattle consists of between 60 and 70 head of pure polled Angus, and of crosses of that breed with the shorthorn bull. A few pure bred shorthorn cows are also kept for the purpose of supplying bull calves to the neighbouring farmers. Mr Fortescue sends his two-year-old crosses to Kingcausie in the course of the summer to graze, and to be fattened during the next winter. These two-year-olds are magnificent cattle, and some of them which had not been sent south when I was at Swanbister were well worth L.26 to L.28 a head.

For some years Mr Fortescue kept a first-rate pack of harriers at Swanbister, and as it was the only thing of the kind that had ever been seen in Orkney, the pack created great excitement, not only among "those Orcadian sportsmen"—to quote "the Druid's" words—who followed "Jehu," as Mr Fortescue was termed, but also among the country people, who "had never seen a leap taken before this new era set in." Mr Fortescue, however, has of late given up hunting.

Although the inland part of the parish of Orphir is hilly, that portion which lies near the shore is a fine tract of country. Much of it consists of a warm good soil. Mr Johnston has improved his property in Orphir in a very satisfactory manner. The road here turns north till it joins the direct road from Kirkwall to Stromness, at the Bridge of Waith, where the waters of the Loch of Stennis empty into the sea. Immediately above the manse of Orphir a magnificent view is obtained of the mountains of Hoy and the south isles generally. Some large farms, such as Petertown and Clestrain, are passed in travelling from Orphir to the Bridge of Waith, near which is the fine townland of Ireland, or more correctly perhaps, Ayreland, which formerly belonged to Colonel Balfour, but was sold by that gentleman a few years ago, in lots varying from 25 to 100 acres in extent. Most of the new proprietors live upon and farm their little estates. They have all built excellent steadings and dwelling-houses on their lots, and have reclaimed nearly the whole townland. Mr Marcus Calder, who purchased 100 acres of the townland, has built an excellent meal mill upon it, and instead of the 30 acres of arable land which he got when he purchased the lot, he has now the whole under cultivation. Colonel Balfour had commenced the improvement of the townland before parting with it, and had laid it all off in ten-acre lots, divided by open ditches, which facilitated subsequent operations by the new proprietors. Those remarkable relics of antiquity, Maeshow and the standing stones of Stennis—the Stonehenge of Scotland—are situated in the parish of Stennis, in the vicinity of the Bridge of Waith. The Loch of Stennis is divided into two parts, one of which is about four miles in length, and the other about five.

The Bridge of Waith is about two and a half miles from Stromness, and most of the land between it and the town forms the Cairston estate, which belongs to James R. Pollexfen, Esq. The improvement of this estate was commenced several years ago by the late Collector Pollexfen, father of the present proprietor, who was an enthusiastic agriculturist and improver of landed property at a time when such was looked upon in Orkney as an almost hopeless undertaking. Among other matters to which the late Mr Pollexfen specially devoted his attention was the production of improved varieties of rye-grass and of green-top yellow bullock turnip; and so successful was he, that the seeds of the varieties grown by him commanded a large sale, and the varieties themselves were described and mentioned with approbation in Lawson's "Agriculturists Manual," published in 1836, and in the supplement to it which was published in 1842. It may be incidentally mentioned, with reference to Mr Pollexfen's cultivation of turnip-seed, that the success which attended his operations induced other farmers in Orkney to attempt the cultivation of turnip-seed, and at one time a considerable quantity of this seed was grown in Orkney. But Mr Pollexfen's imitators did not follow his example in all respects. He grew the seed from carefully selected bulbs, every one of which he personally examined before he passed it; while other growers, for the most part, contented themselves with merely allowing their ordinary crop of turnips to run to seed without putting themselves to the trouble either of selecting the bulbs or of transplanting them. The result was that the seed grown in this way speedily acquired a bad name, and the growers found they had exhausted their land without any remuneration for so doing. There is now comparatively little turnip-seed grown in Orkney. Here and there a patch may be seen in a corner, or even in the centre of a field of oats, but not more apparently than is sufficient for the grower's own use.

To return to Mr Pollexfen's property at Cairston. The improvements commenced by his father have been carried out by the present proprietor, who has expended about L.4000 upon it in draining, buildings, and other improvements, besides upwards of L.2000 on his property in the vicinity of Kirkwall, which consists of 460 acres, 100 acres of which are not improvable except as sheep pasture. The Cairston property contains 1300 acres. The steadings erected by Mr Pollexfen are substantial, and fitted with thrashing-machinery. Water-power has been taken advantage of to erect an excellent meal-mill, a description of agricultural accommodation with which Orkney is now generally well supplied. Mr Pollexfen's tenants hold under leases for nineteen years. Mr Francis Taylor, who is the largest farmer on the property, holds 250 acres. He is noted for the good shorthorn crosses which he rears, and finally sends out fat when they are three years old, realising the highest prices current in the southern markets.

Stromness is a quaint-looking town, although it is not of much antiquity, as we find that at the beginning of the last century "it was an inconsiderable village, consisting only of half a dozen houses with slated roofs, and a few scattered huts." It owes its prosperity to the excellent harbour on the west shore of which the town is situated. This harbour, or roadstead, is much frequented by shipping, who find in it a safe anchorage. The town consists chiefly of one street, about a mile in length, built along the margin of the sea, at the foot of the ridge of granite mentioned by Hugh Miller, in the extract given from his works in a previous part of this report. The street is very narrow, in some parts not being wider than just sufficient to permit the passage of a wheeled vehicle. Many of the houses are built below high-water mark, and most of these have small piers or jetties attached to them. The Orkney mails are carried from Stromness by a small steamer across the Pentland Firth to Scrabster, near Thurso. A proposition has been recently made, and steps taken, to construct a railway between Stromness and Kirkwall. The line, which will be about fourteen miles in length, offers no engineering difficulties whatever; and as the Sutherland and Caithness Railway will soon be completed to Thurso, the Stromness and Kirkwall line will be of much service to Orkney, provided good steamers are put on to cross the Pentland Firth.

The hill at the back of the town of Stromness was, until recently, a piece of poor, bare ground, from which every inch of available surface had been removed for "midden-feal," or compost earth, leaving the ground studded with granite boulders. Of late years it has been trenched at great expense by the feuars in the town, among whom it was divided; the stones were used up in making fences, &c.; and it is now converted into useful land. It is chiefly sown down in grass as pasturage for cows belonging to the town's people.

From Stromness the road through the West Mainland proceeds due north, passing some old cultivated land, and also a tract of waste but improvable land. The parish of Sandwick, which bounds that of Stromness on the north, presents a more fertile aspect, and a more advanced state of agricultural industry. The manse of Sandwick, the residence of the Rev. Dr Charles Clouston, the eminent meteorologist, has a singularly cosy look for an Orkney dwelling, owing to the thriving plantation which is growing in front of it. Dr Clouston has had his glebe of 43 acres in high condition for many years, having been one of the first to set an example in this way, in a district where example was much required. There are about 70 heritors in the parish, and the valuation of many of these lairds does not exceed L.15 to L.20 per annum, and some of them are valued as low as L.5 per annum. They are the relics of the old Norse udallers, a class of freeholders once very common in Orkney, but now existing only in some parts of the West Mainland. Hitherto this class has not done much in improving their lands, and their houses and habits are those of the lowest rank of peasantry. If they make a shilling they put it past, and no inducement is sufficient to cause them to part with it.

The improved appearance of the parish of Sandwick is owing chiefly to the operations carried by W. W. G. Watt, Esq., of Breckness, who owns fully two-thirds of the parish. Mr Watt's father for many years farmed a large portion of his property, and had effected great improvements on it forty years ago, and the work so begun has been carried out on a still more extensive scale by the present proprietor. The farms of Skaill* and Keirfiold (pronounced Keir-fa), which Mr Watt keeps in his own possession, are as highly improved and well cultivated as if they had been situated in East Lothian, instead of the north side of the Pentland Firth. These farms are contiguous, but are worked separately. A considerable part of Skaill has been long under cultivation, whereas but little more than twenty years ago Kierfiold was a rabbit warren and commonty, from which state it has been reclaimed by the present proprietor. The soil of both farms varies from pure sand to a stiff clay loam, and their extent altogether is upwards of 700 acres. Each farm is provided with ample steading accommodation. The rotation followed is the usual four-shift, with the addition of a second year's grass. The oats cultivated are the Sandy, early Angus, and English Beilie, and the weight per bushel ranges from 40 to 43 lbs. Mr Watt does not grow much bear, but when he grows it the weight runs from 48 to 52½ lbs. per bushel. Turnips are a very steady crop with him, and the produce is generally about

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* Skaill is a name which occurs frequently in Orkney, and implies a situation on the sea-side exposed much to the noise of the waves.

20 tons an acre. Artificial manures of all kinds are used largely by him, not alone for turnips, but also in top-dressing the grain crops and grass. The live stock on these farms consists chiefly of cattle which are mostly home-bred. They are shorthorn crosses, and the bulls used are chiefly bred in Aberdeenshire. The young cattle are well fed upon turnips and straw during winter, and are sold off when about two years' old, at which age they weigh about 6 cwt. Any horses bred upon the farms are merely such as are required for farm work, none being bred for sale. Mr Watt's tenants have leases of 15 or 19 years, and their rents range from 2s. 6d. to 22s. per acre; or, say on the average, 12s. per acre. These tenants are going on improving, and doing well. They are not bound to any rotation, and are allowed to fix their own course of cropping; but having done so, they must keep it up. Their steadings are generally pretty fair, and improving with each new lease.

In the parish of Birsay, which lies north of Sandwick, and in the north-west corner of the Mainland, agricultural improvement is as yet rather behind other parts of Orkney. There are some well-improved farms in the parish, such as Board House, occupied by Mr Henry Leask, a man of great skill and intelligence —and the soil generally is good, but it has been stated that there are still from 10,000 to 12,000 acres in the parish lying waste, although highly susceptible of improvement. The principal proprietor in Birsay is the Earl of Zetland, who is a non-resident proprietor.

Harray is the only inland parish in Orkney. The surface is, for the most part, flat and swampy, and not easily drained from want of proper main levels, but in other respects the improvement of the land would be easy. Harray is the property of about 100 lairds, whose valuations run from L.5 to L.50 per annum. These small lairds are, like the same class in the neighbouring parish of Sandwick, the relics of the old udallers, and their properties have descended from father to son since the time when Orkney was subject to Denmark. The Harray lairds are proverbially not an improving class, and even their cattle are much inferior to the cattle in other parts of the country.

The parish of Evie, which bounds Birsay on the east, and faces the island of Rousay, is a fine agricultural district. It is united ecclesiastically with the parish of Rendall, which joins Evie on the south. The estate of Swanny, belonging to Robert Brotchie, Esq., which is situated at the extreme north-west point of Evie, has been much improved of late by the proprietor, who retains the farm of Swanny in his own possession. The farm contains about 400 acres, which have been improved and well laid off. The fields are enclosed chiefly with stone dykes and some intermediate wire fences. The steading is large, and constructed on the best modern principles. Swanny also includes several hundred acres of hill ground, extending to Costa Head, a bold and precipitous headland which faces the Atlantic Ocean. The hill ground forms an excellent run for sheep.

From this point a range of hills of moderate elevation runs in a south-easterly direction, dividing the parishes of Evie and Rendall from those of Birsay and Harray. These hills, if surface drained, would make good grazing for black-faced sheep, but as yet nothing has been done to improve them. Dr Still, of Burgar, is one of the proprietors in the parish of Evie, his place being delightfully situated; and Colonel Balfour owns upwards of 4000 acres in the parish, with which a number of small lairds' lands are intermixed. The farms held by Colonel Balfour's tenants have been nearly all laid out similiar to his lands in other parts of the country; but for some reason or other the people are not so enterprising as the people of the North Isles, and the agriculture of the district is considerably behind that which now prevails in the North Isles. Mr Leask, of Flaws, who is one of the principal tenants in Evie, has a herd of very good polled Aberdeen cattle, which he has kept up by bringing in fresh bulls from Aberdeenshire, but he now proposes to cross his polled cows with shorthorn bulls in order to get more weight and earlier maturity. Aikerness, which was formerly one of the residences of the Honeyman family, but is now Colonel Balfour's property, is a nice farm for a superior class of half-bred sheep. A new pier is to be built in a sheltered nook on the east side of the farm, which will be of much advantage to the district. There is a good deal of rich black loam in Evie, and also good clay soil. In Rendall the soil is generally of a sharper nature than that of Evie. In both parishes a peculiarity is to be noticed, which is found also in nearly all the north isles, namely, that the best land faces the north. Very little has been done in the parish of Rendall in the way of improvement, although the land is highly susceptible of it; and if such were carried out, it would render Evie and Rendall one of the most productive districts in Orkney.

In the parish of Firth, which marches with Rendall on the south, we find, however, certain notable instances of improvement. Seven miles from Kirkwall, on the direct road from that town to Stromness, is Binscarth, the property of Robert Scarth, Esq., whose name I have had occasion to mention in a former portion of these remarks as an early improver of landed property in Orkney. Binscarth lies between two hills, having an elegant modern mansion and thriving plantations on the opposite side from the public road, the farm steading being situated in the hollow.

In 1841, when Mr Scarth became proprietor of Binscarth, the arable land on the property, including two "cott" holdings, was exactly 32 acres, with about an equal extent of bog-meadow and heathy pasture. The tenant paid for the whole L.28, and gave it up as too dear. Mr Scarth's first move was to have the commonty, of which the parish of Firth had a large extent, divided, and for the data of division the old valuation for stipend was adopted. This gave but a very small portion to Binscarth; but having other lands of greater value in the parish, he succeeded in getting the proportion of commonty falling to them laid into Binscarth; and in this way, and by several subsequent purchases, Mr Scarth succeeded in making out a farm, as at present, of 520 acres, of which he keeps 120 acres under a six-shift course—three years grass—leaving the balance in reclaimed and improved pasture for sheep.

As soon as the farm came into Mr Scarth's hands, with the additional land obtained by dividing the commons, his next step was to thorough drain the lands. In carrying this out it was necessary to make a large drain and outfall, one hundred yards of which was 9 to 10 feet deep, through hard rock, at a cost of fully L.100, or L.1 per yard. Mr Scarth had other difficulties to encounter, and one he had not looked for was the bog-iron ore, which completely filled his drain pipes, forming a concrete inside of them as hard and close as the substance of the tile itself. He had, in consequence of this, repeatedly to raise the pipes in the small drains, and even 5-inch pipes, as these were so filled up that the drains were rendered useless. In most cases where this occurred, he put in coupling stones on the top, but he never got quite clear of the ore until the land was deep trenched and thoroughly limed. Since that was done fine crops have been raised yearly on 60 acres, which was formerly a quaking bog, full of iron ore, and which in its natural state would not have summered a calf, if indeed a calf could have stood on it without sinking overhead. In fact, the skeletons of several cattle, which had evidently perished in the bog, were found in draining it.

After draining and liming came enclosing, and Mr Scarth, at an early period of his operations, had what he intended to keep arable divided into 20-acre fields with substantial stone fences, taking care so as to have a pond fed by a running stream in a corner of each field. In conjunction with his neighbours, Mr Scarth also enclosed all round his farm, so that there is now little annoyance experienced from trespass, although for a time after the division of the commons it was almost impossible to protect the land from trespass by wild sheep and geese, which were permitted to roam at large by their owners. Persistent driving off and fencing the lands very soon, however, put an end to the system of promiscuous pasturage, and of course all direct cutting and paring of the surface was also stopped. In a very short time the hill-sides began to have a green appearance, and give a fair bite to sheep, after being protected, and the natural grasses allowed to shed their seeds; and being further assisted by a little judicious top-dressing here and there, the formerly waste hill grounds have now become of value to their owners.

Mr Scarth next attempted planting, and having enclosed and planted 12 acres in the bottom of the glen under Binscarth House, he has for some years supplied himself with paling from the thinnings, and proved that wood can be grown in Orkney if the plantations get fair play. He has also a mile of as well-grown and well-kept thorn hedges as will be found anywhere in Scotland.

Without entering into minute details, I may mention that, after thorough draining, Mr Scarth has found lime his most valuable auxiliary. He has also most successfully extended his cultivation of turnips by the use of purchased manures, and of these he has, for some years, applied the following mixture, in addition to half farm-yard dung:—1 ton Peruvian guano, 1 ton dissolved bones, 1 ton drill bones, 1 ton crushed bones, and 4 tons of "cutweed" kelp, crushed. These materials are carefully mixed, and the mixture applied at the rate of 2 to 3 cwt. per acre. The making of the cutweed kelp costs 50s. per ton, and that description of kelp is the least valuable in the market.

On another part of his property in the same parish Mr Scarth has made two fine farms, of 150 acres each, entirely out of what was formerly common waste land, producing on these farms turnips and fodder for a flock of Cheviot sheep and a herd of West Highland cattle. On each farm there is a well-planned slate-roofed steading and four cottage dwellings. having each an allotment of 10 acres. These allotments are granted to the tenants for the mere interest on the outlay incurred and on improving leases. The cottages accommodate labourers, to whom Mr Scarth pays from 12s. to 15s. a week. The improvement of each 150 acres was conducted in precisely the same way as the improvement of Binscarth. the only difference being that the squares were 10 acres instead of 20, and these were divided by open ditches 5 feet wide by 3 feet deep. Ten bolls of Sunderland lime—60 bushels—were applied for the first crop of oats, and a similar quantity on the surface, and harrowed in before sowing down the land with oats and grass seeds. In some parts the surface soil had been so completely carried off that there was a total want of vegetable matter, to restore which Mr Scarth formed large compost heaps of black bog moss, mixed with quicklime, which, after being repeatedly turned over, were applied to the pared parts of the land as a thick top-dressing.

It must not be supposed that Mr Scarth is merely an enthusiastic land improver, who is content to ride his hobby without counting the cost. He has all his life been a thorough business man, the best proof of which is that he was for many years agent in Kirkwall for the Union Bank, besides holding factor-ships of several important estates. When Mr Scarth, therefore, says that his improvements have paid him, there can be no doubt of the fact. During the twenty-six years over which his improvements in the parish of Firth have extended, the capital laid out has been returned with interest. "From my own experience," he says in a letter with which he favoured me, "I believe that we have thousands of acres of waste land in the Mainland of Orkney capable of making a fair return for capital skilfully applied to its improvement, and this belief is, I have reason to think, now shared in by many of the so-called 'small lairds' near me, who formerly kept their savings hoarded in a bank at 2½ per cent., and would as soon have thought of throwing it into the sea as of laying it out for drainage or lime, or in any attempt to improve their waste lands. If they go on, these small lairds promise soon to become large lairds, for the greater part of them have large shares of the waste, and the late prices of stock have fairly opened their eyes to where the profit lies. The spirit of improvement is now aroused all around me, and instead of deprecating improvement and the laying out of money, as I often used to meet with, I have now small lairds, and even tenants, asking advice as to drainage and the improvement of their wastes."

Testimony of this kind from a gentleman of such experience as Mr Scarth is invaluable, and shows how effectual is the force of such an example as that which is afforded by the improved condition of his Binscarth property.

On leaving Firth, the road to Kirkwall passes round the base of Wideford Hill. On the right is the farm of Quanterness, which was formerly part of the commonty belonging to the town of Kirkwall. It contains about 500 acres, and was purchased some years ago by the late Mr Cumming, whose son is now the proprietor. About half of the farm has been improved, and a good house and steading erected upon it. Adjoining Quanterness is the farm of Saverock, which belongs to Mr David Munro. It contains 300 acres, of which about 60 acres was old land. The rest is all new land, which has been improved out of heather. A dwelling-house and first-rate steading, with 6-horse thrashing-machine, has been put up on the farm. Hatston, which belongs to the heirs of the late James Spence, Esq., has been so much improved that it is let at exactly three times the rent paid for it twenty-five years ago. After passing Hatston and Grainbank, the residence of Andrew Gold, Esq., factor for the Earl of Zetland, the traveller once more re-enters Kirkwall. Of this ancient town, its fine old cathedral, or its palatial ruins, it does not lie with me to give any particular description. Of late years several important improvements have been made in the town, and the large and well-stocked shops in its principal streets show that it is the centre of a thriving community.

At one time the burgh owned a large extent of commonty, which was of little or no value in its natural state. Portions of it were sold occasionally, even so far back as 1813, but the principal sales have been made within the last twenty-five years. The lots ranged from 30 acres to 120 acres, and the prices obtained varied from 3s. or 4s. an acre up to L.10, the average being 25s. to 30s. an acre. The burgh reserved a feu-duty of 1s. an acre. These lots have been all improved, adding very much to the appearance of the district around the town. Old properties in the vicinity of Kirkwall have also been much improved of late years. I have already alluded to Mr Pollexfen's improvements at Weyland, which adjoins Kirkwall, and that gentleman at present has the property in his own hands. Papdale, which is also in the parish, was formerly the property of the Laing family, and their principal residence in Orkney. It now belongs to John Charles Dundas, Esq., Lord-Lieutenant of the county of Orkney and Shetland, who purchased it recently from the representatives of the late Frederick Dundas, Esq., M.P. That gentleman laid out a large amount of money in thorough draining and otherwise improving the lands. The property consists of about 300 acres, and is let at rents varying from 25s. to 60s. an acre; the highest rented portions being chiefly let as accommodation land to the town's people. Crantit was formerly the official residence of the Crown Chamberlain for Orkney, and when the Crown estates were sold it was bought by Captain Scott, who gave up ploughing the ocean to become land improver. Crantit lies in the hollow which runs from Kirkwall south to Scapa, and much of the land was liable to be flooded by heavy rains. Captain Scott, however, succeeded in laying the land dry, but at considerable expense. He also drained the uplands, and built an exceedingly neat steading on the farm. Crantit contains 280 acres, and the original cost was between L.4000 and L.5000, but much more than the original cost has been expended in improving the farm.

The East Mainland.—This division of the Mainland includes about half of the parish of St Ola, and the parishes of St Andrews, Deerness, and Holm. On the north the coast is deeply indented by Inganess Bay and Deersound. The surface may be described as gently undulating, without rising in any part beyond a moderate elevation. Near the junction of the parishes of St Ola and St Andrews, and overlooking Inganess Bay, is the farm of Wideford, containing about 550 acres. Twenty-five years ago the arable land of this farm did not exceed 60 acres, but the whole extent has been improved by Mr Iverach, with the exception of 30 acres, which are kept as an outrun. The soil is mostly of a clayey nature, and produces heavy crops under Mr Iverach's liberal management. The rotation followed is the ordinary five shift course. The farm has been drained thoroughly, stones having been used for filling the drains instead of tiles. Mr Iverach was cutting a crop of clover and rye-grass on the day I visited the farm, and the crop was so luxuriant that a powerful mowing-machine could scarcely get through it. The land on which that crop was grown, when Mr Iverach commenced the improvement of his farm, was poor common waste ground. Mr Iverach has also improved another farm of 120 acres, adjoining Wideford, which, when he purchased it, was altogether commonty land. The farms in that part of the parish of St Ola are all much improved, and at Birstane House, which is beautifully situated on the west side of Inganess Bay—a spacious roadstead where the British fleet could lie at anchor—there is a thriving plantation, the thinnings of which are suitable for paling and other purposes. The property belongs to Mrs William Balfour, who resides at Birstane House, and the Mains farm, which is let to a tenant, is well managed. It consists of nearly 300 acres, and is subdivided into suitable fields by fine thorn and beech hedges and stone dykes.

On entering the parish of St Andrews the signs of improvement become less marked. Most of the holdings are small, and, for the most part, are not held on lease. A new system, however, has been lately introduced on Dr Baikie's estate of Tankerness. All the farms on the property have been revalued, and leases given. This will tend to stimulate improvement, for which there is ample room, as the cropped land is in general very dirty, and is much in want of draining, manure, and lime. There is a large extent of improvable land in the parish, which, although desolate-looking at present, is not more so than much that has been improved in Orkney with very satisfactory results. At the Hall of Tankerness there is some very fair land, which has been long cultivated. Mr Leitch, who has the management of Dr Baikie's estates, has recently effected some material improvements in the home-farm, upon which there is a large, although not a modern steading. Lord Zetland is proprietor of the fine farm of Sebay in this parish, where a large and most substantially built corn-mill, fitted up with excellent machinery, has been erected by the proprietor.

The parishes of St Andrews and Deerness are joined together by a narrow neck of sandy ground. The land in Deerness is highly susceptible of improvement. The soil mostly consists of loam, resting on red clay. Draining, and a liberal application of shell sand, of which there is an inexhaustible supply on the shores, are improvements which would pay well in Deerness. A beginning has been made, and Colonel Balfour's property in the parish was laid off in ten-acre lots, divided by open drains, as in Shapinshay. That estate, however, was sold in August 1872.

It consisted of 584 acres, and was put up in 23 lots, each lot being a separate holding. The upset price was L.7300, and the amount actually realised was L.10,562; fourteen lots, containing altogether 324 acres, having been purchased by Colonel Balfour's late tenants.

The houses of the peasantry are built of the clay slate of the district, which is laid as easily as brick. The outside walls are not pointed, which gives them a cold, unfinished appearance. This is common in all parts of Orkney where a new style of cottage has not been introduced. The cottages, &c., are one story in height; and usually, the houses which constitute the steading are built in two lines facing each other, with a space of only about 6 feet wide between the rows of houses. The side-walls are 2 feet thick, and the gable 3 feet thick. The outside courses are "lipped" with mortar, for about 4 inches; and the centre of each course is closely packed with clay, which makes the houses very warm, as the walls are thus rendered perfectly air-tight. Cottages built in this way are, of course, much more cheaply erected than if the walls were built throughout with mortar. Each steading of the old style has its little kiln for drying corn previous to milling it; but this feature is omitted in the more recently erected steadings, and the corn is now dried on the kiln, which forms part of each newly-constructed meal-mill. The old houses are roofed with straw or heath, which is twisted into a rope, locally known as "simmons." These "simmons" are stretched in close parallel lines across the roof from eave to eave; and when the whole roof has been covered in this way, some loose straw is put over all, which is bound down by a second layer of "simmons;" and alternate layers of straw and simmons are put on, until it is considered that the roof is complete. The outer or last row of "simmons" is weighted down by having long and heavy flagstones placed in the folds of the ropes immediately above the eaves. These flags prevent the thatch from being carried away by the wind.

The average rent of arable land in the district is about 10s. an acre.

In this district and in the adjoining parish of Holm, I saw bullocks worked singly in carts; and also, in different instances, a bullock and a horse yoked together as a plough team. This was on small farms; and the great drawback against small farmers in Orkney improving waste land, whether as owners or tenants, is the deficiency they labour under in respect to horse-power. When a large farmer improves land of that kind, he first ploughs down the heathy surface with a strong furrow, and after this has been left to rot for a year, the land gets a second furrow with a large or "Tweeddale" plough, into which four bullocks or six horses are yoked, after which a third furrow is given with the common plough. The small farmer, who has perhaps only a pair of horses, cannot prepare the land in this manner. He must be content with lightly ploughing the surface; and, to make up for imperfect cultivation, he has to stimulate the crop with guano. As there is no body of soil to work upon, the land which has been reclaimed in this manner soon becomes exhausted, and instances are not wanting where land which had been imperfectly reclaimed is now very little better than it was when in its natural state. Experienced improvers of land in Orkney do not consider that guano should be much used in the case of new land. They prefer artificial manures of a phosphatic nature, with which a portion of guano may be mixed. Some prefer farm-yard dung for new land, and others speak well of the results produced by sea-weed; while those who put farm dung on new land use artificial manures, for the most part in conjunction with a portion of farm dung, on their old lands.

In referring to the use of guano, I may mention one mode of applying it, which, I understand, has been adopted by a number of farmers in Orkney. This is to mix guano with their seed oats. The oats are spread on part of a road which has been previously swept clean, and, after being slightly damped, is then mixed with Peruvian guano, at the rate of about 2 stone of guano to the bushel (42 lb. to 43 lb.) of oats. Where this process has been adopted, 1 cwt. of guano per acre is considered sufficient to apply afterwards as a top-dressing. This mode of preparing seed oats was first introduced by Mr Fortescue, and it has been found useful as a preventive against grub.

I have already had occasion to refer to the parish of Holm, with relation to certain improvements carried out on the Græmeshall estate, so far back as 1828; and also with respect to efforts made by the late Mr David Petrie, when factor on the property, for the improvement of the breed of cattle in the district. The parish is situated on the south shore of the East Mainland, about seven miles from Kirkwall. The land slopes gently to the south, and the old cultivated land consists mostly of a warm loam, which is easily cultivated. The higher ground, which divides Holm from the parish of St Andrews, was until lately a common; and there we find the red clay subsoil which is so common in many parts of Orkney. From the days of Bishop Græme, who occupied the see of Orkney from 1615 to 1638, and who built the existing mansion of Græmeshall in 1625, the parish of Holm was considered one of the most forward districts in Orkney; but of late years it has rather fallen behind, or, perhaps, it would be more correct to say that it has not advanced so rapidly as other districts. It is understood, however, that material changes are likely to occur on the expiration of some leases which are nearly run out. In saying this, I allude to the

Græmeshall estate, which is the largest in the parish. The proprietor is non-resident; but his son, A. M. S. Græme, Esq., lives most part of the year at Græmeshall, and takes a very lively interest in agricultural matters. The rents for old lands range from 12s. to 15s. an acre, which is moderate, considering the fertile nature of the land and its other advantages.

The improvement of the breed of cattle in Holm, which was commenced by the late Mr Petrie, has been carried on by others since his time, and in this matter Mr James Heddle, Greenwall, a tenant on the Græmeshall estate, has taken a leading part. Mr Heddle has had a number of shorthorn bulls successively from the Duke of Buccleuch's herd at Dalkeith Park, and the bull which he has at present, Bazaine (27,994), bred by his Grace, is a very superior animal. Mr Heddle's cattle show a deal of breeding, and those which he sends out fat in spring have for several years topped the Aberdeen market. Mr Heddle's Leicester rams have been got from Fentonbarns and other first-rate flocks in the south. Some of the land on Greenwall farm has been down for ten or eleven years in permanent grass, and is excellent pasture. A considerable extent of new land has been reclaimed and added to the farm by Mr Heddle.

When the commonty lands in the parish of Holm were sold in 1848, Mr Traill, of Holland, whose success as an improver of waste lands has been noticed in the account I have given of the North Isles, purchased 1200 acres, to which he gave the name of New Holland. Mr Traill's property is situated on the highest lying part of the parish, and its improvement was a formidable undertaking. Mr Traill did not begin operations until 1858, and since that time 450 acres have been reclaimed; and as the reclamation is still going on, the entire extent will be improved in due course. Draining, from the nature of the soil, was essential, and lime has also been found an important agent in effecting the amelioration of the land, which was originally of a moory nature on the surface, resting on red clay subsoil. The improved land has been divided into 20-acre fields, most of which are fenced with stone dykes. A very commodious and substantially built steading, which is perhaps the best in Orkney, has been erected on the farm, and attached to it is a fixed 10-horse power steam-engine for driving the machinery. Farm roads have been constructed, and altogether New Holland is another very satisfactory illustration of the results which may be expected from the improvement of waste lands, when such is done in a judicious manner. It is Mr Traill's intention to stock the farm chiefly with sheep.

The South Isles.—The first of this group is the island of Burray, which is separated from the East Mainland by Holm Sound, a ferry about four miles wide. The island belongs to

Lord Zetland. A considerable part of it is a light sandy loam; and when it was held by Captain Sutherland (afterwards Lord Duffus), rabbits formed a very important part of the live stock, and I have frequently heard on good authority that their skins paid Captain Sutherland's rent. This was during the French war, when rabbit-skins were much more valuable than they have become since that period. Captain Sutherland introduced some new kinds of rabbits among the original wild breed, and I believe that Burray rabbit-skins to this day are worth twopence or threepence each more than skins from other places. Mr Shirreff mentions a curious circumstance in his report, which, I suspect, would scarcely hold good at the present day. After stating that Captain Sutherland usually grew from 12 to 20 acres of turnips, Mr Shirreff says—"In crossing the field several times, looking at the crop, above a score of rabbits started up, and there was hardly a turnip to be seen that was not wounded by them more or less. Some of them, probably from being sweeter than the general crop, were more than half consumed, though in most instances they were merely tasted. Captain Sutherland found the rabbits prospered most when allowed to pasture at will in the turnip field, and he was the more induced to indulge them, *as he found the turnips never rotted* in consequence of the wounds they got from the rabbits, nor did what remained prove less useful to his cattle." Turnip growers of the present day find that bulbs which have been wounded by rabbits soon become rotten and useless. Captain Sutherland, however, effected more good to Orkney by introducing the West Highland breed of cattle into the country than by importing new breeds of rabbits. The late Mr Laird, who was principal tenant of the island some years ago, kept up the West Highland breed, as stated in a previous part of this report, but his son, who succeeded him, has crossed it with the shorthorn, and produced a very superior class of cattle.

Burray is separated from South Ronaldshay by Watersound, which is about a mile broad. South Ronaldshay is seven or eight miles in length, and the width varies from one and a half mile to five and a half miles. Lord Zetland is the principal proprietor in the island. The excellent roadsteads of St Margaret's Hope and Widewall Bay are well known to mariners as safe harbours of refuge in stormy weather. The principal village in the island is at St Margaret's Hope. It contains several well-built modern houses, and is one of the principal herring-fishing stations in Orkney. The soil in South Ronaldshay is mostly a strong clay, which yields heavy crops of all kinds under good management, and there is now to be found in this island as good farming as one can meet with in any part of the kingdom, presenting a remarkable contrast to the condition of agriculture in it twenty-five years ago. It is to Mr William Cromarty that South Ronaldshay chiefly owes its present much improved state. Mr Cromarty commenced his improvements on the farm of Widewall, of which he was tenant, in 1844. At that time the farm only contained about 70 acres of arable land, but in the course of three or four years Mr Cromarty had 300 acres in cultivation. On the farm of Carra Mr Cromarty more recently reclaimed 340 acres out of heather. These farms were all thoroughly drained, and first-rate steadings erected upon them by Mr Cromarty at his own cost. The cattle on these farms are shorthorn crosses, bulls having been regularly imported for the purpose from the best breeders in Aberdeenshire, &c., and these crosses have been sold fat, when only two years old, for L 30 each. Comparatively few sheep are kept in the island.

Amongst the other occupiers of land in South Ronaldshay who have distinguished themselves as improvers are Mr Banks, who farms his own estate of Smiddybanks, a nice place near St Margaret's Hope; Mr Grey of Roeberry; Captain Cromarty; Mr Robertson, tenant of Grutha; and Mr James Allan, tenant of Burwick, in the south end of the island. Improvements are now also becoming general amongst the ordinary class of tenants in South Ronaldshay. Lord Zetland's lands are low-rented, which, no doubt, has had an effect in stimulating improvement. A number of the small tenants, however, are amphibious in their habits—more so, perhaps, than in any other part of Orkney—being half fishermen and half farmers, and for this reason they generally go off to the fishing at the very time when their attention is most required for the land, leaving their wives and children to look after the crops. This tends to render labour rather scarce at times in the island, more especially when extra hands are required on the large farms for turnip-thinning, harvest work, &c.

In South Ronaldshay, as well as in other parts of Orkney, the prevailing defect is the want of fences. There are no doubt many farms in Orkney, as I have had occasion to notice, which are either wholly or partially enclosed with stone dykes, and wire-fencing has also been introduced to some extent, although not so suitable a fence for Orkney as stone walls, seeing that wire-fences do not afford shelter, which is a main point in Orkney. The want of fences renders it necessary to have boys to herd the cattle on the pasture during the day, and of keeping them shut up in a small enclosed field or in a yard at night. The cattle do not get full justice done them under this system, besides the great amount of trouble it occasions. There is this to be said in explanation of the want of fences, that Orkney proprietors and farmers have hitherto been so much engaged in the work of reclamation, that they have not had time as yet to complete their improvements by enclosing their fields; but as every one feels the want of fences, I have no doubt that in a very few years this defect will be entirely removed, at least on all the large farms, more especially as Orkney possesses ample supplies of the best materials for erecting stone fences.

The island of Hoy, which is the largest island in Orkney, with the exception of the Mainland, is about twelve miles in length, and fully five in breadth at the widest part; but the isthmus, which connects South Walls (the southernmost part of the island) with the northern portion, is so narrow that very little would convert South Walls into a separate island. The island contains two parishes, namely, Hoy and Walls. But although the superficial extent of the island of Hoy is considerable, its value in an agricultural point of view is much less than that of other islands of the Orkney group, the area of which is more limited in extent. The magnificent harbour of Longhope, which is about five miles in length, and about one and a half mile in breadth in some parts, is situated in the parish of Walls. It affords the most secure anchorage, and as many as from 80 to 100 vessels have been seen at one time in the harbour waiting for favourable winds. Walls is the best part of the island, and some extensive improvements were carried out some years ago at Melsetter by a former proprietor, and a large flock of Cheviot sheep was introduced which succeeded well, but little or nothing has been done for the other parts of Hoy. If surface drained, the mountain range in the island would suit black-faced sheep. Hoy is one of the great resorts of tourists who visit Orkney, as it derives its interest from the magnificent rock-scenery on the west side of the island, where the cliffs rise 1000 feet perpendicular above the sea.

There are several small islands in the South Isles group—Flotta, Faray, and Græmsay being the most important—but there is nothing in their agricultural condition which calls for remark. They are all naturally fertile, and susceptible of much improvement.

General Remarks.

Having thus concluded the circuit of the Orkney Islands, there are one or two points, in connection with the descriptive account given in the preceding pages of the present condition of agriculture in Orkney, upon which I wish to make a few remarks.

It will have been noticed that the production of live stock, and especially of cattle, is a leading feature in the agricultural economy of Orkney. Until the farms are all properly fenced, sheep-breeding cannot be carried on to the extent which might otherwise be done. It is desirable, however, from the nature of the soil in many parts of Orkney, that sheep-breeding should be more extensively followed, particularly on the light sandy loams, as the consumption of the turnip crops, or a portion of them, on such soils by sheep, would much improve the condition of the land.

Orkney cattle are what is called "great thrivers" when taken to the south, and hence they are much in demand in Aberdeenshire and other parts of the north-east and east of Scotland. To meet that demand, Orkney is ranged by dealers from the south nearly all the year round, and especially during the spring and summer months, and these men give long prices for the stock. As the voyage from Kirkwall to Aberdeen is accomplished in about ten hours, the cattle arrive at their destination in a very fresh state, quite unlike that of Irish cattle, which are usually knocked about for several days in railway waggons and steamboats, without food or water. Another reason why Orkney cattle are so much run after is their freedom from contagious and infectious diseases. About seven or eight years ago a bull was imported into Orkney which was affected with foot-and-mouth disease. He was travelled on foot from Kirkwall to the parish of Harray, and, being unable to proceed further, was laid up at a farm in that part of the West Mainland. From that centre the infection spread throughout the Mainland, following the route along which the animal had travelled, but did not extend to any of the other islands. That outbreak was ultimately subdued by means of a system of rigid isolation, and no case of the kind has since appeared in the country. A few years ago two heifers were imported by a farmer in one of the North Isles, and soon after their arrival they showed symptoms of pleuro-pneumonia. The owner immediately shut them up in a "holm," which was only used as sheep pasture, where they ultimately died. These were the only occasions on which any contagious or infectious diseases were imported into Orkney. They taught the people, however, the necessity of using every precaution against the introduction of disease through the medium of animals imported into the country, and therefore no animals are now allowed to be landed in Orkney unless accompanied by a clean bill of health. There is, in fact, little risk of diseased animals being imported into Orkney, as it is only a few bulls and heifers, or rams for breeding purposes, that are brought into the country. Rheumatic affections appear to be somewhat prevalent amongst Orkney cattle after a cold spring, and catarrh, or "common cold," in November, after a wet harvest. Want of shelter is, of course, the cause of these complaints. Braxy is very little known among sheep in Orkney; scab is by no means prevalent; and the fly or maggot in sheep is rarely troublesome.

The system of managing live stock which prevails in Orkney and which experience has shown to be best adapted to the circumstances of the country, is to sell the young cattle when under two years old, and the sheep when shearlings. This answers better than keeping them longer, and finishing them off for the butcher. The agricultural returns illustrate this feature in Orkney agriculture. Thus, in 1871, we find that Orkney farmers had 8783 cows and heifers in milk or in calf, 3499 cattle two years old and upwards, and no less than 10,548 head under two years old. Hence it is evident that the surplus stock are cleared off before they attain two years of age. The high prices realised for young cattle have encouraged this system, year-olds bred by small tenants having brought from L.10 to L.12 each, and those bred on large farms from L.15 to L.18 each. Owing to such prices, a farmer who has reared half-a-dozen of yearling cattle soon pays the rent of a fair-sized farm in Orkney. His risk is comparatively little, and he has not to wait perhaps three years before he turns his cattle into money. There is one point in connection with the rearing of live stock in Orkney which deserves to be noticed. Grain grown in Orkney, when sent to Leith, costs the farmer about 4s. of expense per quarter one way or another. This is, therefore, a serious drawback, and the question arises, whether Orkney farmers, instead of sending their grain in bulk to market, would not benefit more by using it liberally in feeding their young cattle and sheep along with turnips, although not going so far as to finish their stock for the butcher. The good shorthorn crosses, which are now for the most part bred throughout Orkney, would pay well for such treatment; and judging from other circumstances of a similar kind, I am confident that the grain would be more profitably disposed of in this way than by marketing it in its natural state. This also holds good with reference to young sheep of the Leicester and Cheviot cross.

That cattle and sheep have increased in numbers in Orkney under the new system of farming will at once be seen from the following statement:—Mr Hall Maxwell, in his Agricultural Statistics of Scotland for 1857, reported that there were at that time in Orkney 14,887 head of cattle, and 13,586 sheep of all ages. The agricultural returns, published by the Board of Trade, state that in 1871 the number of cattle in Orkney amounted to 22,830 head, and of sheep to 26,978 head. Although the increase in the number of live stock has been considerable within the period mentioned, it is not to be supposed that Orkney has reached the limit of production. It is as yet far from that point; and if we take into account the great extent of reclaimable waste land which still exists in Orkney, more especially in the Mainland and the hilly ranges, which may be made available as sheep pasture, combined with the spirit of improvement which has already done so much for the country, and is yearly increasing, even in the most backward districts, it is not too much to expect that the number of live stock bred in Orkney will be doubled in the course of another fifteen or twenty years.

I have had occasion to refer in the course of this report to swine as being a kind of live stock of considerable importance in Orkney. In 1857 Mr Hall Maxwell returned 2749 animals under this head, while in 1871 the numbers were 6369. Bacon-curing is conducted on a somewhat extensive scale by an enterprising Irish curer, who has established himself in Kirkwall; and there are also a number of small curers in different parts of the islands.

An increased demand for farm labourers has been a necessary result of the improvement of agriculture in Orkney. Thirty years ago, previous to the introduction of the now prevailing system of farm management, the wages of ploughmen were L.7 to L.7, 10s. a year, with six bolls (sixty stones) of meal, one Scots pint (two quarts) of milk per day, some potatoes and fuel. When kept in the farm-house they were fed largely on rabbits, at least in those parts where rabbits abounded; and as fish were always plentiful, their board cost little. Day labourers were paid from 1s. to 1s. 4d., and women 6d. per day. Boys employed in herding cattle got 15s. to 20s. for the summer half year, with food. The wages now paid to ploughmen range from L.14 to L.18 per annum, with the same allowances of meal, milk, &c., as formerly. Day labourers are paid 2s. 6d. a day, and in harvest the same, but with board and lodgings or an equivalent in money. Women employed in field work get 10d. to 1s. a day, and 1s. 6d. a day in harvest, with food, or 2s. without food. Herd-boys get L.2 for the half year, with food. Female field workers are now becoming scarce in some parts of Orkney, partly owing to the number of Orkney women who go south looking for household service, and partly also from the circumstance that small farmers are now growing more turnips, and otherwise improving their farm management, so that they require to keep their daughters at home, instead of allowing them to go out and work on the large farms.

In the course of some remarks made in the "Times" on certain improvements effected by the Duke of Sutherland, it was said that the results of the operations in Sutherlandshire presented some "suggestive and instructive facts." I believe that the same words may be applied with great truth to the improvements which have been effected in the agriculture of the Orkney Islands during the last twenty-five years. It reflects no small credit on those who have promoted agricultural improvement in Orkney, that they have succeeded in raising a district, the agriculture of which, only a quarter of a century ago, was a by-word and reproach, to the position which Orkney now occupies as an agricultural district.* It is doubtful, indeed, whether any part of the United Kingdom has been improved in so remarkable a manner as Orkney within the period mentioned. Not only have the old arable lands been rendered more productive than they were under the old system, but thousands of acres have been brought into profitable cultivation; superior breeds of live stock have superseded the very inferior kinds which formerly existed; and the condition of the people, their habits and habitations, have undergone a material change for the better. It is as well, however, to understand that although Orkney and Shetland are politically connected, these two groups of islands have nothing now in common as regards their agricultural condition. At one period there was considerable similarity in the agricultural customs of Orkney and Shetland, but that no longer exists; and this has been recognised by the Highland and Agricultural Society, which has offered premiums for separate reports for Orkney and Shetland.

Subordinate Sources of Industry.

The Fisheries.—A report on the Orkney Islands would scarcely be considered complete without some reference to certain subordinate branches of industry existing in the islands; and of these the fisheries and the kelp manufacture are the most important.

From the position of the Orkney Islands, it would be naturally supposed that the fisheries form the staple industry of the country; but such is not the case. The late Mr Samuel Laing used great efforts to encourage the herring fishery in Orkney, and his exertions were so successful that at one time upwards of 400 boats were engaged in it in the North Isles, delivering the fish caught at Whitehall Station in Stronsay. In 1837 the herrings cured in Orkney amounted to 42,073 barrels, but so much has this branch of industry declined, that in 1871 the total herrings cured in the Orkney Isles amounted only to 12,720 barrels. In 1872 the fishing was more successful, the quantity caught being about two-thirds more than it was in the previous year. In 1871 there were 448,468 cod, ling, and hake cured in Orkney, being far short of the results of a similar fishery in Shetland. This description of fish is chiefly caught by smacks from Grimsby, which fish as far north as the Faroe Islands and even Iceland, and on their return deliver their fish to curers in Orkney. Lobsters are caught in great numbers and sent to London; indeed, so much has this fishery been prosecuted of late years, that lobsters have now become scarce in many parts of Orkney, where formerly they were abundant. A minor description of fishery—although not the less important considered as the means of supplying food for the people—is that of the coal-fish in its earliest stages, when it is known as the "sillock" and the "cuithe," according to age, the first being the youngest and least in size. These sillocks are about six inches in length, and literally swarm in myriads in every creek and bay during the winter months. They are caught with little trouble, and are much used as food by the people. If it be asked why the fisheries are so little prosecuted in Orkney, the reason seems to be the constant employment and higher remuneration afforded on farms in the different islands. Fishing is an uncertain mode of obtaining a living, and it is accompanied by greater discomforts than are experienced in following farm labour. Hence young men generally prefer the latter, and comparatively few of them become professional fishermen.

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* Upwards of 300 reaping-machines have been brought into the country during the past three or four years.

The Kelp Manufacture—The manufacture of kelp has been carried on in Orkney for about 150 years, and its value has been subject to great fluctuations during that period. The highest price ever realised for kelp was L.22 per ton of 21 cwt., and that was received only for one cargo. During the French war L.21 per ton was a common price; but thirty years ago it fell so low as L.2, 5s. per ton for cutweed kelp, and L.4 for that which was made from driftweed. When chemical manufacturers turned their attention to the extraction of iodine from kelp, its value rose to 50s. per ton for cutweed kelp, and L.5, 10s. for driftweed kelp. For a number of years Mr Hughes, chemical manufacturer, Bo'ness, consumed all the kelp made in Orkney, but in 1858 Mr Paterson of Glasgow commenced to purchase Orkney kelp, giving L.3, 3s. per ton for cutweed kelp, and L.7 per ton for the kelp made from driftweed. From that time prices have fluctuated, the less valuable article bringing from L.2, 10s. to L3, 3s. per ton, and the driftweed kelp from L5, 10s. to L.7 per ton. For some years all the proprietors on whose estates kelp is made are under contract either to Mr Hughes, Bo'ness, or to Messrs W. & M. Paterson, Glasgow, at rates varying from L.2, 10s. to L.3 per ton for cutweed kelp, and from L.6, 10s. to L.6, 15s. per ton for driftweed kelp. These contracts expire, I understand, in the fall of 1873.

Kelp is manufactured from different kinds of sea-weeds:—1. Bell wrack (*Fucus nodosus*), known in Orkney under the name of "yellow tang." This variety occupies the shore a little below high-water mark. 2. Jagged wrack (*F. serratus*), which also goes under the name of yellow tang, and grows on the shore between the last-named variety and low-water mark. 3. Sea wrack (*F. vesiculosus*), known by the name of "sea oak," or "black tang," is found a little above low-water mark. These three varieties are manufactured into "cutweed kelp," the chief value of which consists in the alkalies it contains. 4. Ware (*F. digitatus*), which grows below low-water mark; in fact, at low-water only a few inches of the blades are seen above the surface, and its long stalk, or "tangle," is the most valuable part of the plant for the manufacture of kelp. It is from this variety of sea-weed that "driftweed kelp" is manufactured, and the higher money value of that article is owing to the large proportion of iodine which it contains. It has been stated in the course of this report that vast quantities of sea-ware are driven ashore in different parts of Orkney. That which comes ashore during the winter and spring months is put on the land as manure, but in those parts where kelp is manufactured the people are careful to pick out all the "tangle" of the ware, and to build it up in high stacks to dry. In the course of the summer the tangle preserved in this manner is burned along with that which came on shore towards the end of April and during May. If the weather is fine in May, kelp of very superior quality is made, but if a tract of rainy weather sets in, it is impossible for the workers to make so good an article for market; and there is often much fine kelp injured also from not storing it in proper time, exposure to rain or air being highly injurious to its quality. There is another thing that lessens the value of kelp, namely, the nefarious practice which some workers adopt of adulterating it during the process of manufacture by mixing sand, and even stones, with it to increase the weight.

For the last twelve years there have been from 1200 to 1300 tons of kelp made annually in Orkney. Of that quantity, from 250 to 280 tons consist of cutweed kelp, which leaves little or no profit, owing to the low price it brings in the market. But its manufacture gives employment to the people who have to be kept to make the driftweed kelp, and the price they get for it assists in paying the rents of their crofts. The quantity of kelp made annually in Orkney might be vastly increased, were it not that labour is too scarce to prosecute the manufacture as it should be done. As it is, much driftweed is annually lost in the North Isles from want of people to collect it, and also from want of ground to spread it on. Orkney has long been famed for producing the best quality of kelp, not so much, perhaps, from any superior quality of the weed from which it is manufactured, as from the great expertness of the workers. Owing to their dexterity very fine kelp is often made from weed that has suffered much from bad weather; and there is little doubt that if the makers were better paid, more kelp would be made and adulteration less practised. Even at the present value of kelp, it is so important a source of income that the value of the kelp manufactured on some estates in Orkney is fully equal to half the land rent.

As one of the great means of promoting further improvement in Orkney is direct postal and traffic communication with the south, I may be allowed to notice a scheme which has been put forth since the foregoing remarks were written. The "Mechanics' Magazine" of October 5, 1872, contained certain details of a project for utilising the natural site of a harbour at St John's Head, Caithness, in order to have better and more direct communication with Orkney than exists at present. The author of this scheme is Mr James Purves, Lochend, near Thurso, who possesses an intimate knowledge of the localities. The Sutherland and Caithness Railway, which is at present in course of formation, will bring the towns of Wick and Thurso, and the county of Caithness generally, in direct communication by rail with all parts of Great Britain. Thurso is the nearest point to Orkney which the rail will reach. The communication between Thurso and Stromness in Orkney, as already stated, is carried on by means of a small steamer which carries the mails. The distance from port to port is 29 miles, the passage being made across the most exposed part of the Pentland Firth, and open throughout nearly the entire route to the full fury of storms from the north-west. To remedy this Mr Purves proposes to take advantage of, and sufficiently extend, the natural harbour of St John's Head, situated on the coast of Caithness about midway between Dunnet Head and Duncansbay Head, and directly opposite the entrance to Longhope in Walls, the firth at this point being only 8½ miles wide. It was, in fact, the route over which the Orkney mails were carried in small open boats from 1744 to 1856. Mr Purves proposes that the route shall be extended to Scapa Bay, near Kirkwall, where a new pier is to be erected, and once across the firth the remainder of the passage would be made in smooth water. The route may be marked on the map by a straight line drawn from port to port. Mr Purves's scheme has much to recommend it, but to carry it out fully railway communication would require to be established between the harbour at St John's Head and the towns of Wick and Thurso, which would be easily effected. The establishment of such a line of communication would be of immense advantage to Orkney, but if left to local enterprise there would be little prospect of carrying it out. Being, however, of national as well as of local importance, it should be brought under the notice of Parliament, in order to secure, if possible, the co-operation of the Government in carrying it out.

The progress which has been made in Orkney under the new system of agriculture, introduced within the last thirty years, compared with its condition under the old system of management, is clearly shown by the following tables of exports from the islands at two different periods, namely, 1833 and 1871. The table of exports for 1833 is taken from Dr Clouston's "General Observations on the County of Orkney," published in the "New Statistical Account of Scotland" (1842). For the abstract of exports for the year 1871, I am indebted to Mr George Petrie, Clerk of Supply of Orkney, who kindly undertook to prepare it for me, from returns furnished to him by the agents of the various shipping companies in Orkney, and from other trustworthy sources.

Exports in 1833.

Bear, 5178 bolls (6 bush.),	L.3,883	10	0
White oats, 1515 bolls,	909	0	0
Malt, 10,696 bushels,	1,604	8	0
Peas, 234 bushels,	35	2	0
Oatmeal, 40 bolls (140 lb.),	28	0	0
Horses, cows, and oxen, 1200 altogether,	5,394	0	0
Eggs, 100,000 dozen,	2,500	0	0
Sheep and swine, 40 of each,	80	0	0
Butter,	2,000	0	0
Hides,	700	0	0
Rabbit skins,	600	0	0
Feathers,	250	0	0
Kelp,	2,250	0	0
Straw-plait manufacture,	4,800	0	0
Herrings, 34,000 barrels,	17,000	0	0
Cod, &c.,	7,280	0	0
Lobsters,	1,800	0	0
	L.51,114	0	0

Dr Clouston included in his table the wages earned by men from Orkney engaged at the whale fishing in Greenland, and wages paid by the Hudson's Bay Company to natives of Orkney, but I have omitted these items, as they do not represent produce.

Exports in 1871.

Cattle, 5301,	L.79,515	0	0
Horses, 243,	4,860	0	0
Sheep, 7226,	10,838	10	0
Pigs (live), 210,	735	0	0
Do. (dead), 1614,	5,649	0	0
Bacon, 13,497 cwt.,	33,742	0	0
Oats and bear, 40,000 qrs.,	45,000	0	0
Oat and bear meal, 2730 bolls,	2,047	10	0
Potatoes, 1034 tons,	3,102	0	0
Turnips, 180 ,,	90	0	0
Hay, 151 ,,	302	0	0
Butter, 802 cwt.,	4,116	18	8
Hides,	86	0	0
Bones, 13 tons,	65	0	0
Lard,	13	0	0
Wool, 669 st. (24 lbs.),	669	0	0
Eggs, 717,090 dozens,	26,890	19	2
Rags, 1454 cwt.,	678	10	8
Carry forward,	L.218,400	8	6

Brought forward,	L.218,400	8	6
Peats, 428 tons,	60	0	0
Cod, ling, and tusk, 593 tons,	12,453	0	0
Herrings, 8147 barrels,	12,220	10	0
Lobsters, 51,900 (number),	2,597	0	0
Oysters, 1020 bags = 525,000 in number,	1,530	0	0
Whelks, 982 bushels,	73	0	0
Whale oil, 6 barrels,	60	0	0
Kelp, 836 tons,	4,180	0	0
	L.251,573	18	6

It is right to mention, in connection with the foregoing table of exports for 1871, that a considerable quantity of grain, &c., was exported direct from South Ronaldshay, of which an account could not be obtained. A distillery in the vicinity of Kirkwall, which was reopened in 1871, after being for several years idle, used in that year 1500 qrs. of bere, which, of course, is not taken into account.

Other evidence of progress is afforded by the valuation of the county. The valuation in 1855 was as follows:—

North Isles,	L.13,558	18	0
Mainland parishes,	18,511	3	0
South Isles,	4,634	11	0
	L.36,704	12	0

The valuation for 1872–3 is as follows:—

North Isles,	L.18,890	18	5
Mainland,	29,362	2	2
South Isles,	7,269	19	6
	L.55,523	0	1
Total increase in 17 years,	L.18,818	8	1

ON THE AGRICULTURE OF THE ISLANDS OF ORKNEY.

By Thomas Farrall, Dovenby, Cockermouth, Cumberland.

[*Premium—Minor Gold Medal.*]

Introduction.

In framing a Report on the Agriculture of the Islands of Orkney, I may mention that I have had ample opportunities of witnessing the different methods pursued, and have made a thorough investigation as to the progress made during the last twenty-five years; I therefore presume to offer the present paper. In addition to the knowledge derived from observation, I have endeavoured to elicit sound information upon every subject likely to be interesting and useful, from the most intelligent and authentic sources, and with this view I have visited almost every district in Orkney.

Extent and Situation.

The Orkney Islands—anciently known as the Orcades—form a little over one-third part of the entire county of Orkney, which also embraces the Shetland Isles. They are divided from the mainland of Scotland by the Pentland Firth, and comprise Pomona (or Mainland), Græmsay, Hoy, Waas, Rissay, Faray, Cavay, Flotay, South Ronaldshay, Swannay, Pentland Skerry, Burray, Lambholm, Copinshay, Shapinshay, Stronsay, Papa-Stronsay, Eday, Faray, Sanday, North Ronaldshay, Westray, Papa-Westray, and many others, amounting altogether to 67 in number, 38 of which are uninhabited. They extend from 58° 43′ to 59° 25′ N. latitude, and from 2° 20′ to 3° 25′ W. longitude, and lie in the Northern Ocean, between the coast of Caithness and Shetland, from the former of which they are distant only about four, and from the latter nearly twenty leagues. The coast-line is extremely irregular, the force of the tides and storms having indented the land very much. Most of the islands slope to the west, although this feature is not so noticeable as it is in the mainland of Scotland. It is the opinion of many eminent geologists and other scientific men, that these islands have been separated from the northern coast of Great Britain either by some convulsion of nature or by the violence of the ocean; and when the force of the winds and rapidity of the tides are taken into consideration, it does not seem at all improbable that such may have been the case. Pomona is the principal island, the extent of which from north to south is about 30 miles, and from east to west 15 to 18 miles. Many of the islands contain a good body of soil, well calculated either for the production of grain or the growth of nutritious grasses for the pasturage of cattle. Already the skill of the agriculturist, aided by the brawny arm of the labourer, has done much to convert large slopes of "breck" into undulating lawns of smoothest surface, and expansive tracts of barren heath into the finest pasture.

Climate.

The Orkney Islands, surrounded by the Atlantic Ocean, experience in the highest degree the ameliorating influence of its waters. Continually bathed by the waters of the Gulf Stream, they are peculiarly protected from extremes of heat and cold, the result being that the climate is much more even than that of many other places almost under the same parallel, the extremes being greater as the east is approached, a fact which the following table clearly indicates:—

	Mean Annual Temperature.	Mean Temp. of Summer.	Mean Temp. of Winter.
Stromness, . . .	46·5	55·17	38·14
Christiania, . .	41·45	59·8	23·18
Petersburg, . . .	39·61	61·68	18 6

Professor Maury, in his "Physical Geography of the Sea," says, in reference to the mildness of an Orkney winter, that "the isothermal lines of 60°, 50°, &c., starting off from the parallel of 40°, near the coasts of the United States, run off in a north-eastwardly direction, showing the same oceanic temperature on the European side of the Atlantic, in latitude 55° or 60°, that we have on the western side in latitude 40°. Scott, in one of his beautiful novels, tells us that the ponds in the Orkneys (latitude near 60°) are not frozen in winter. The people there owe their soft climate to this grand heating apparatus (the Gulf Stream), and to the latent heat of the vapours from which it is liberated during the precipitation of them upon the regions round about. Driftwood from the West Indies is occasionally cast upon the islands of the North Sea and Northern Ocean by the Gulf Stream."

It will thus be seen that the islands seldom experience severe cold, and vegetation remains in mid-winter brilliantly green, while frost seldom is so intense as to waste turnips, which are allowed to remain exposed in the fields. As spring advances everything begins to flourish; but soon the scene changes—there is very little brilliant weather in summer. When the sun is highest in the meridian there is frequently a clouded sky, and very little sunshine. The crops, in the meantime, arrested in their progress, are not the better for two months' slumbering under the clouds. Under the skies of Orkney cereals grow well while in the stage of green crops, but the process of ripening is painfully slow and uncertain. Now, to corn growers the success of this process is of the utmost importance. The corn harvest in Orkney falls late in the year—September and October—when the days are short, and the skies dull and leaden. Thus it is that the plains of southern Russia, or of the Red River in Canada, with a comparatively rigorous climate, far excel Orkney as grain-producing countries, because their short summer is one of uninterrupted and fierce sunshine—their grain is ripened all at once, and the harvest ingathered without delay or difficulty. The lack of bright sunshine and the excessive humidity of the climate of Orkney are, doubtless, the chief reasons why that all-important bread-making cereal, wheat, cannot be cultivated with success.

Soil.

With respect to the geological structure of Orkney, the Old Red Sandstone, which is so extensively developed in the northern division of Scotland, is continued in the Orkney Islands. The whole country lying around Cromarty Firth, the coasts of the Moray Firth, eastward to a point beyond the Spey, the east coast of Ross and Sutherland, and nearly the whole of Caithness-shire, are of this rock, and, as I have said, it also enters largely into the geological constitution of the Orkney Islands. From the great admixture of the prevailing surface and subsoils, it would be tedious and uninteresting to enter into every particular respecting them; but I may mention that the most common are brick-clay, loam, and a mixture of peat-moss, which are in general of no great depth, as rock or *till* (schistose clay) often only lies a foot or two beneath the surface, and seriously impedes deep tillage. For example, in the south of Mainland, where the land is moderately level, the soil is thin and stony, being composed of a mixture of clay and sandy loam, while the high land has a deep peat-soil or *yarpha.* Near the middle of Pomona the soil improves, first into a mixture of moss and clay, then into one compounded of sand, clay, and gravel; and at last it discloses a rich loam, that predominates over a large tract in the centre. The soil of the island of Sanday, as its name implies, is composed principally of sand. From its comparative fertility it has been called the "Garden of Orkney," and even at the present day, with the exception of South Ronaldshay, in no part of Orkney has agricultural prosperity been more thoroughly developed. In the northern islands the soil rests upon strata consisting of sandstone, sandstone-flag, schistose clay, and limestone; in some instances of basalt, and in some of breccia; while the islands of the south, though differing so materially in the character of surface-soil, have a subsoil of a similar nature. The Mainland abounds in sandstone-flag, which, in a country like Orkney, so destitute of hedges and timber, is a great boon to the inhabitants for building, roofing, draining, and the erection of walls or stone-dykes. So far, however, very few have availed themselves of the opportunities thus afforded for carrying out these improvements on an extensive scale.

The State of Drainage in Orkney.

In the month of August last I made a very extensive personal survey of the principal islands in Orkney; and taking into consideration the nature of the soils which predominate, I have arrived at the conclusion that, although on many estates a considerable extent of draining has been effected within the last ten or twelve years, either solely by the landlord, by the landlord and tenant conjointly, by the tenant alone, or by the aid of a loan from Government, and that more still is in progress, the drainage is still lamentably defective, there being very few farms that do not require either more or less; and it is obvious that where the landlord does not give liberal assistance, it is too often totally neglected. Seeing that drainage is very important throughout the temperate regions of the globe, and especially so in a comparatively humid climate like that of Orkney, it stands to reason that before farming can be carried on efficiently, the land must first be made dry. Manures will, evidently, be ineffective so long as the soil is not in a proper state to receive them. Atmospheric influences are not confined to the foliage of the crops, but extend also to the roots in the ground, and vegetation must be retarded unless the land be thoroughly drained and properly pulverised. But the practice of draining at the present day is totally different from what it was twenty to thirty years ago. As in most other places, the efforts of the Orkney drainer in the primitive days of farming, for the most part, if not altogether, were directed to the removal of wetness caused by springs. The approved plan was to cut a drain across the land near the origin of the spring, or, in the language of the farmer, "between the wet and the dry," the depth being regulated by the circumstances of the case, but rarely was 2½ feet exceeded. These openings were filled to within a few inches of the surface with broken stones, and it is really wonderful how effective some of the drains still are which have been laid down for forty or fifty years. A little later, slates were set up at each side of the bottom of the drain, meeting at an angle of 60°, after which about one foot in thickness of broken stones was filled in. This kind of drain was a decided improvement on the other, but in common with the first plan it lacked depth, three feet seldom being reached. A third method has also frequently been adopted. A middle-sized stone is set on each side of the bottom of the drain, and a third stone being laid across the top, the arrangement is complete. Of late years tiles have been introduced, but never used extensively, owing to the abundance of stone available for the purpose, which is everywhere to be found. On hard subsoils, tiles in the shape of an inverted "U," or, as they are sometimes called, "horse-shoe" tiles, are used, but on sandy lands pipe-tiles packed in moss have been found to answer best, inasmuch as the loose sand is prevented from stopping up the water-courses. But on strong clay lands many, both factors and farmers, still hold the opinion that stone drains are as effective as those put down with tiles. As to the comparative advantage of using stones or tiles for drains, it is scarcely safe to risk an opinion, but I may safely state that the stone drain has the advantage of exposing a larger surface, and

Fig 1.

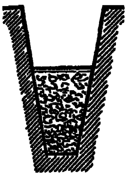


Fig. 2.

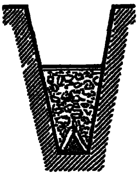


Fig. 3.

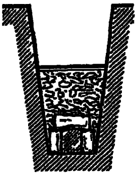


Fig. 4.

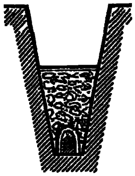
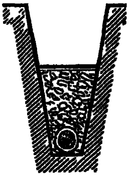


Fig. 5.



will take in the water more rapidly, except the tile drains are filled with stones, as in the foregoing diagrams. Tiles are preferable where the land is flat. A tile and sole, or a pipe with a few inches of stones broken to pass through a two-and-a-half-inch ring, is the *ne plus ultra* of draining. An extensive proprietor and occupier in the west of Mainland writes with respect to drainage:—

> "All the land I occupy being generally very dry, I have required very little draining; what I have done is with drains about an average of three feet deep, coupled with flat slate stone, with small or broken stone on each side and over the couples, except in some sandy ground, where I had to use pipes laid and packed round with moss, to prevent the sand getting into the pipes. A few proprietors and tenants have drained a considerable extent—viz., the Rev. Mr Garson of Bea; Mr Leask of Swartland, proprietors; and Mr Walker in Pow, a tenant of mine, as well as a few others in a smaller way. I am not aware of any Government money having been taken in this parish (Sandwick)."

Another correspondent states:—

> "The drainage of the land is far from complete, although much has lately been accomplished. Drains were frequently put in too shallow—2 to 2½ feet being the usual depth. A large proportion of the land in Orkney being so near the rock prevents many from attempting the operation. There is still much to be done before an outlet be made for all the surplus water which hinders the cultivation of the land and starves our crops."

An intelligent farmer in Rousay says:—

> "This important branch of agricultural development (drainage) has been carried on to a very fair extent in this island within the past twenty years. The drains are put in, say 15 feet apart, and are from 2½ to 4 feet deep, by 14 inches in width at bottom, and 18 to 20 at the top. They are generally coupled with stones, as tiles are used only in exceptional cases."

A landed proprietor in South Ronaldshay writes:—

> "During the last 20 years there has been great improvement through drainage. Land that used to be barren by being overrun with cold spring water is now giving fine crops throughout the rotation. There is still much room for progress in this branch, but people are having their eyes opened, and in many cases they are finding their money in the sack's mouth."

System of Management and Cultivation.

The generality of farms are managed on a mixed system of grain and stock farming, and cultivated on a five-course rotation of cropping. There are, however, still a few exceptions, where farms are cropped after the three, four, or six-course rotation, either through the small size of the farms, through prejudice to the general system, or owing to peculiarity of situation, quality of soil, or other circumstances. These exceptional courses of cropping will hereafter be fully described. The five-shift rotation is taken in the following order:—

1. Oats, out of lea.
2. Turnips, potatoes, and a little mangold.
3. Bere, or oats, with grass seeds.
4. First grass, usually cut for hay.
5. Second grass, pastured by cattle.

The cultivation of the different crops shall now be noticed in the above order of rotation:—

First year—Oats.—The first crop usually taken is oats, on the grass lea of one strong furrow. The ploughing commences early in February as a rule, although some farmers occupying clay soils have fallen into the habit of ploughing out the lea grounds in the autumn months, or at least early in winter, and thus leaving them exposed to the ameliorating influences of the atmosphere. Towards the latter end of March, or early in April, according as the soil is in a fit condition for the reception of the seed, the ground is sown with from five to six imperial bushels of oats per acre. Should the land be in poor heart, the generality of leading farmers top dress with bones or prepared manure at the rate of 1½ to 2, or even 3 cwts. per acre. The effect of this top-dressing is marvellous; not only is the yield much increased, but the quality is also materially improved, and a far heavier bulk of straw is secured. From 5 to 6 qrs. of oats is considered a fair return, and the weight usually attained is from 40 to 43 lbs. per bushel. The land after sowing is well operated upon with a pair of heavy harrows; and when the soil is in any degree stiff and clayey, it is crossed with a pair of lighter ones until the surface is smooth and even. On light sandy lands the roller is gradually gaining favour, as the process of consolidation gives the seed a much better hold of the ground, by which insect and other pests are kept in abeyance; besides, it gives a more level surface to the land, so that the operations of reaping and raking are much facilitated in harvest. The rolling is seldom deferred until the blade has made its appearance. Weeding of cereals is very little attended to; with the exception of docks and thistles, which are sometimes pulled by hand or "weeding tongs," this important operation is almost wholly neglected. The oat crop is generally cut before the grain may be termed dead ripe, and while many of the ears are still in a partially unripe state: at that stage it yields more grain of equally good quality, and the straw is more nutritious than when quite ripe. When fully matured, the upper grains often fall out in working, and they form without doubt the best part of the crop. Bere may be ripened rather harder than the oat, as the upper grains are not so liable to fall away. A frequent change of all seeds is always profitable if brought from an early climate to a late, or from a light soil to a heavy, and *vice versâ*, and this is more particularly an important point in a climate like that of Orkney, where the harvest is often late and the weather precarious. All grain should be sifted before sowing, in order to clean it of the various weed-seeds which are often scattered in the fields along with the crops. The shape of the Orkney stacks has much improved of late, although on small holdings they still are fashioned in a manner which I can scarcely recommend. They are made to slope almost from bottom to top, so that a maximum amount of thatch is required. The stacks are, however, rarely made too large, therefore very little grain is wasted when once it has been made secure under "thack and rape."

The varieties of oats generally grown are:—

1. The potato, which yields much meal, and is preferred for household purposes.
2. Blainslee, prolific cropper, but deteriorates in a few years.
3. The Early Angus, well liked both as regards quality of grain and the early period of ripening.
4. The common oat, used when much straw is required.
5. The Scotch Berlie, much liked for thin land.
6. The Kildrummy, yields excellent returns both in straw and grain, on the poorest soils.
7. The Tartarian, well adapted to the soil, and held in high estimation.
8. Red oats, of a rough description, but grow luxuriantly, and yield well.
9. Gray oats, used to be extensively cultivated, but have been almost entirely superseded in late years by some of the above varieties.

The grain having been ingathered, pigs, geese, &c., are turned into the fields to pick up stray ears, and gather the oats which are shed. Should a period of fine weather ensue, or as it is sometimes called "a second summer," many farmers now cross-cut the lea furrows in the autumn months, and leave the land in a rough state until the following spring. It is then operated upon by a pair of heavy harrows, and it is found to be far more friable, and consequently much more easily brought into the necessary fineness of tilth, than when left over until February or March. And yet I may notice that some farmers have still a very strong objection to leaving the land "to wash," as they term it, by the heavy winter rains.

Second Crop—Turnips and Potatoes.—On the approach of fine weather in the spring season no time is lost in preparing the portion of land set apart for the potato crop. By the introduction of improved ploughs, harrows, and cultivators, this is much more simple than it was a few years ago; moreover, when once the land has undergone a thorough course of cleansing it is comparatively easy to operate upon. Most of the soils are easily brought into a fine tilth for cropping, but several kinds of weeds are common, and some of them are extremely difficult to eradicate. The following are the principal weeds which the farmer has to contend with, and which are indigenous to the soil:—

1. Couch or quick grass (*Triticum repens*).
2. Bearded or wild oats (*Avena fatua*).
3. Shepherd's needle (*Scandix Pecten*).
4. Wild mustard (*Sinapis arvensis*).
5. Stinking May-weed (*Anthemis Cotula*).
6. Blue-bottle (*Centaurea Cyanus*).
7. Coltsfoot (*Tussilago Farfara*).
8. Corn-thistle (*Carduus lanceolatus*).

Towards the beginning of April the potato land is thrown into ridges of 30 to 32 inches wide, by means of a double-mould-board plough, and from 25 to 30 small loads—10 to 12 cwts. each—of farmyard manure forked into the drills. The practice is to plant potatoes of the middling size uncut, from 10 to 12 inches apart, for the early sorts, and from 12 to 16 inches between the sets for the later varieties, thus giving room for sun and air—indispensable elements for all plants. The sets are placed pretty deep in the ground, so as to admit of being well earthed up by the plough, which prevents the inroads made by winged pests, and hinders the tubers from growing outside the drills. Nothing is more conducive to the growth of the potato than a deep loose soil, and plenty of horse-work in paring down and furrowing up the ridges. This will be best accomplished in the early stages of their growth. Before the plants break through the ground, the ridges are well operated upon by the saddle-harrow, which gives the first spring braird of weeds a salutary check. When the plants have attained a length of 3 to 5 inches, they are hoed and hand-weeded, the bottoms of the furrows meanwhile being well loosened by the stitch-harrow. A little later, soil is added by the double-mould-board plough, and, with the exception of a little manipulation in pulling up stray weeds which may have escaped previously, the labour incurred by the potato crop is completed. I noticed that in many of the potato crops in Orkney there was a decided superabundance of stem, as well as a profusion of flower, at the time of my visit last summer (1872), both of which have a marked tendency to lessen the size of the tubers. On inquiry if any plan had been tried to mitigate the evil which I have just named, the answers given were always that nothing had been done. I, however, offered one or two suggestions, which many farmers readily "took a note of," as Captain Cuttle did of old, and they intend giving the system I recommended a fair trial next year. In order to obtain tubers of a medium size great attention should be paid to the following points, viz:—

1. The superfluous "eyes" of the seed-potato ought to be scooped out, leaving only one or two of the leading eyes.

2. Where the eyes are not scooped out, all but one or two leading stems may be pulled up after attaining a length of 3 inches.

3. Defloration may be practised with advantage, women and boys being employed to nip off the flower-buds. When all superfluous stems are removed light and air are admitted, and by the removal of the flower-buds the tubers attain a much larger size.

The following are the descriptions of potato principally grown in the Orkneys:—

1. Common kidney, in gardens for early use.
2. Myatt's kidney, productive, also confined to gardens.
3. First early, round, white flesh, not a large increase.
4. Second early, round, deeper eyes than first early, good increase, flesh a little yellow.
5. Red rock, grown by a few farmers, but not largely.
6. Orkney red, attains a large size, prolific cropper, stands the climate well; in fact, *the* potato of the majority of the islands.

In October or November, when the potatoes are lifted, they are placed in thin layers, either upon the ground outside or in an open shed, until they are thoroughly dried, when they are put into long heaps and covered with straw and earth. From 8 to 10 tons per acre is reckoned a good yield, but as far as 12 tons of Orkney reds have occasionally been produced.

Turnips.—The land intended for the turnip crop is treated similarly to that planted with potatoes, but as there is more time on hand it usually gets the lion's share of the labour. The soil, when ready, is formed into ridges of 26 to 28 inches in width, and about 15 tons of farmyard manure or sea-ware (*Fucus digitatus*) put in per acre; and by way of giving the plants a start, 2 or 3 cwts. of guano, phospho-guano, or special turnip manure, are also applied. Sometimes the drills are of too small dimensions on small, and even medium-sized farms, which is a great mistake. A good fair deepness is also essential, in order that the manure may be properly covered from the drought, and also that the roots of the turnips may have full scope for action, notwithstanding that the principle be a little adverse to Mr Huxtable's theory of "growing turnips upon *deal boards.*" Dissolved bones seem to be in high repute owing to the quickness of action, but, of course, they do not last so long in the land. The turnip seed is deposited by a double drill at the rate of 1½ to 2 lbs. per acre, and as there is no pest of the genus *haltica*—the much-dreaded turnip beetle—the plants are sufficiently plentiful. On many farms, I may remark, there is evidence of the pains taken in the singling and cleaning of the crops. Women and boys are mostly engaged in thinning, but where a sufficient staff of extra hands cannot be had, the "horsemen," or ploughmen, have occasionally to be employed. Now and then complaints arise as to the prevalence of finger-and-toe, but, as a rule, very little damage is sustained from anbury. The turnip plant seems to thrive well in Orkney, many of the crops attaining to a bulk of from 24 to 28 tons of the Swedish varieties, and 20 to 21 of yellow bulbs. The following varieties are chiefly grown:—

1. The common white or globe turnip.
2. The white Pomeranian.
3. The yellow bullock.
4. The green-topped golden yellow—a great favourite.
5. Skirving's Swede.
6. Laing's improved Swede.

The roots, however free and fleshy they may appear, do not seem to contain so much nutrition as those grown upon the mainland of Scotland, so that cattle do not improve so rapidly as might naturally be expected when fed upon them. But, perhaps, too little care is bestowed upon the storing of turnips; they are generally left in the fields throughout the winter months exposed to the weather, by which, doubtless, their feeding properties are much impaired. Passing over the waste caused by exposure to frost, snow, and rain, on the approach of fine weather a second growth sets in, and the roots are consequently deprived of a considerable proportion of those nutritious properties so valuable in the formation of beef and mutton. Besides, how much more comfortable it is for the labourer to go to the pit for a load of turnips, than to have to wade in the fields ankle deep in mire! Very little mangold is grown; but on some of the deeper loams this root might be cultivated with profit, as it would be found to form a valuable addition to the winter feeding substances, especially late in the season.

Third Crop—Oats or Bere, with grass seeds.—The third crop in the rotation consists of oats or bere, with grass seeds. A few years ago the crop taken after turnips and potatoes consisted almost solely of bere, but as oat straw makes much more valuable fodder, some farmers have drifted in to regard oats entirely as the third crop in the rotation. It is, however, conceded on all hands that seeds grow much better with bere. A few farmers now use the drill for sowing, putting down 2 to 2½ bushels of seed per acre, in drills 7 inches apart, which tends to prevent lodgment of the crop, and the deterioration, if not total destruction of the young grasses. The weight and quality of grain from drill-sowing are always superior, but there is seldom the same quantity of grain as from broadcast sowing: 5½ quarters per acre is a fair average, but some crops attain to as far as 40, or even 42 bushels, the weight per bushel ranging from 50 to 55 lbs. On dry soils the flat principle of laying down land to grass is adopted, as furrows and ridges are unsightly and unprofitable, and certainly superfluous on dry and well-cultivated farms.

Fourth Year—Grass Seeds.—A good selection of grass seeds is a most important point in all good farming, because, if grass seeds do not grow and fill the ground with a close sward, weeds will soon fill up the vacancies. Timothy is fast getting out of repute, as the great labour in again clearing it from the soil renders it unsuitable for alternate husbandry. The old practice of sowing indiscriminately seeds of grasses and weeds from the hay-loft is happily dying out, and there are now few farmers who begrudge paying a good price for a genuine article, knowing that they will in time be amply remunerated for their outlay. The following example will afford a fair idea of the quantities and kinds of seeds used on high-class farms, subject, of course, to certain modifications. The seeds were sown on a 12-acre field upon an estate in the north of Pomona.

1. Rye-grass, 30 bushels, or 2½ per acre.
2. Timothy, 18 lbs., or 1½ per acre.
3 Red clover, 60 lbs., or 5 per acre.
4. White clover, 18 lbs., or 1½ per acre.
5. Alsike clover, 24 lbs., or 2 per acre.
6. Rib-grass, 12 lbs., or 1 per acre.

The red clovers luxuriate in Orkney, and are well adapted for hay and pasture. The quantity of white clover may appear small, but it flourishes so well that most farmers deem it sufficient. Clover sickness is exceedingly rare. Alsike clover grows luxuriantly on most kinds of land; but from the smallness of its seeds and its spreading propensities, many farmers consider 1 lb. per acre ample. When it is very thickly sown, it seems to take the place of other grasses, and its rich succulent herbage, when in full flower, appears to upset the stomachs of the cattle. With comparatively few is it highly esteemed. When the seeds are sown, the land is well rolled, and there is no doubt that repeated rollings on light land go far to insure a good crop of grass.

The first grass is usually made into hay. The general practice is to cut it early, when the rye-grass is fully shot, and most of the clover heads are in bloom; it then makes the most nutritious hay, is least injurious to the soil, and gives the best chance of a second crop. The method of making hay does not gain favour by close inspection. The grass is first cut down, and after having been dried a little in the swathe, it is tied up into small bundles, which are piled up into medium-sized "pikes," pointed at the top. In this state the hay is often allowed to remain many weeks, until, what with damp from the ground and exposure to the atmosphere, a considerable proportion of the nutritious elements have escaped. The greener and sweeter hay can be secured, in the opinion of the writer, the better it is for feeding purposes: horses and cattle also eat it with greater avidity.

Fifth Year—Second Grass.—With respect to the second year's grass there is very little to notice; the ground is depastured by cattle and sheep throughout the summer months, and on the best-regulated farms great care is taken to cut down or pluck out thistles, docks, and the like, to prevent them from seeding. "One year's seeding is seven years' weeding," is a maxim which the majority of farmers seem to understand thoroughly.

I previously mentioned that, in addition to the five-course shift, there are other systems of rotation pursued, although they are by no means common, and, as I was several times credibly informed, are year by year giving way to the system I have already explained. I shall now describe them in detail:—

The Three-course Shift.—This is the original system of cropping, if system it can be called, which was practised in the early part of the century, and still exists on some small holdings, particularly in the northern islands. The rotation is:—1. Oats; 2. Turnips and potatoes; 3. Bere.

That lands cropped in this way fail to produce good cereals or large roots is no wonder, since the soil is frequently in an exhausted condition, in spite of the heavy dressings of farmyard manure and sea-ware which are occasionally given. As grasses seem to arise spontaneously, and are found to clothe the surface of every zone, taking a substance varying according to the soil and climate, it seems but natural that when a piece of soil needs rest, it ought to be put down with grass. This at once "puts out of court" the three-course rotation, inasmuch as the important point of assimilating the mode of culture to the waywardness of nature is entirely neglected.

The Four-course Shift.—A few small farms in Rousay, Stronsay, and South Ronaldshay, as well as in Pomona, are worked on the four-year shift, or one-fourth in grass, one-fourth in turnips and potatoes, and one-half in oats and bere. The rotation stands thus:—

1. Oats, out of lea.
2. Turnips and potatoes, out of oat stubble.
3. Oats, or bere; principally the latter, with grass seeds.
4. Grass.

On a few of the large farm, the four-course rotation is also adopted, as, for example, that occupied by Mr Henry Leask of Boardhouse, in the north of Mainland, but he informed the reporter that he intends to drift into the five-course system as quickly as he can, as he is of opinion that the scythe and reaping-machine take so much from the soil that it is almost impossible to keep it in good heart. On farms where the four-course rotation is adhered to, it is general to mow one-half of the seeds and graze the other half, reversing the operation when the same fields are next in grass. The clover roots are found to furnish ample material for an excellent crop of oats in the succeeding year, or what is called "the first outbreak."

The Six-course Shift.—A few farmers who have a plentiful supply of sea-ware at hand, which they can haul at pleasure, prefer the six-course rotation, because, by extra management, they are enabled to take two white crops in succession. Their rotation stands thus:—

1. Oats.
2. Oats.
3. Turnips and potatoes.
4. Bere.
5. First grass.
6. Second grass.

On the removal of the first crop of oats the ground is ploughed, and a good dressing of sea-weed given, which is thoroughly incorporated with the soil before the next seeding time. Many landlords, however, object to the practice of taking two successive white crops, and the more general introduction of leases is rapidly giving the death-blow to this kind of management.

There is still another six-course rotation pursued by some agriculturists, which is similar to the five-course system, only the land lies three years in grass in place of two.

The five-course shift is preferred to all others by the majority of landlords, as may be inferred from the leases which they grant, and most farmers also believe it to be the best. Circumstances, however, vary so much that no plan is beneficial to all alike, and the occupiers of many small holdings, struggling on from hand to mouth, are compelled to do as best they can. All farmers, certainly, seem to be agreed that some sort of a rotation of cropping is necessary, in order that the land may not be exhausted by over-cropping, be they the occupiers of 300 acre farms or the tenants of 6 acre holdings. All plants require *humus*—decayed animal and vegetable matter—for their growth and support, which must exist naturally in the soil from the decay of vegetation, or be supplied artificially, but they differ as to the mineral constituents which they abstract from the soil. If, therefore, the same plant be successively cultivated, the soil rapidly becomes exhausted of that particular kind of food which the plant requires. This is one of the chief reasons for the necessity of a rotation of crops, and it suggests the rule on which the rotation should be founded, viz., that those plants should be cultivated in succession which extract different kinds of inorganic food from the soil, and the rotation should be so ordered that the various fertilising properties of the soil should, by the change of crops, be successively called into requisition. It is therefore necessary that a farmer should first understand *where* he is to farm, and *what kind of soil* he is about to farm, before he can properly fix his rotation or farm to the best advantage.

Breeds of Cattle in Orkney.

The native cattle do not seem to differ materially from those formerly bred and reared on an extensive scale in Caithness and Sutherland. Owing to the attention lately paid to the breeding of cattle they have been much improved, but a few years ago the native type had dwindled down to a very small size, as the extreme privations which the animals had to undergo in winter, from being indifferently housed, badly fed, and improperly treated in every respect, did not tend to develop them in point of size or strength. Their colour is either white, black, or brown, and in a few cases mottled or brindled. Though the native cattle be neither large nor handsome, yet some of them, when well cared for, exhibit great beauty of contour and softness of touch. Thirty to thirty-five years ago L.2 to L.3 was thought a good price for a cow; and when Mr Clouston, a farmer in the west of Mainland, sold a milch cow on the market stance of Stromness for L.4, the occurrence furnished a topic of conversation in "agricultural circles" for many weeks. However, the breed has been very much improved, owing to the introduction of pure shorthorn and Devon bulls, and, in some cases, males of the polled-Angus type. In South Ronaldshay, in particular, is this improvement noticeable, and in place of receiving L.2 or L.3 for cattle as in bygone days, farmers frequently sell prime fat animals for L.22 to L.25, or even L.30. In many districts of Pomona, also, almost pure-bred shorthorns are generally kept, and the breeding and rearing of cattle is one part of the mixed farming carried on which receives very much attention. Last spring good two-year-old heifers—for which there was an excellent demand—sold as high as L.16 to L.22. Doubts exist in the minds of many intelligent farmers whether any *real* improvement has been effected with respect to the milking properties of dairy cows by the introduction of shorthorn blood; but that the crosses are much disposed to fatten is universally admitted. That "pedigree and pail are opposed." that is if the former be carried out "too fine and too far," is certain, but still the introduction of "blood," to a certain extent, must not only be an improvement in the formation of flesh, but it also, undoubtedly, tends to increase the milking powers, if due care be taken to select the breeding animals from those noted as pail cattle. Perhaps the greatest improvement in cattle has taken place within the past seven or ten years, in consequence of an increased emulation amongst farmers in breeding and rearing, but I cannot refrain from noticing that the first stepping-stone was laid by Captain Sutherland of Burray, when he introduced the famous Dunrobin breed. Since greater facilities were afforded for shipping cattle, farmers are applying their energies to the rearing of superior descriptions for the southern markets. Some proprietors have even gone so far in improving their breeds that they have purchased animals from the famous herds at Sittyton and Kingcausie. The two-year-olds are mostly bought up by dealers from Aberdeen, Caithness, Edinburgh, and Banffshire, who scour the ever-faithful shorthorn districts in spring and summer, going about from farm to farm.

The rearing of calves is now carefully attended to. Until a month or six weeks old, new milk is given, when blue or skim milk is gradually substituted, with an allowance of boiled linseed or gruel. The young cattle are fed in byres or open sheds in the winter months, upon straw and turnips, supplied *ad libitum*, some being allowed to run upon the pastures in the middle of the day when the weather is favourable.

Comparatively few animals are fed off ready for the butcher; they are generally put "forward in condition," and finished out in the counties of Scotland, whither they are sent. In South Ronaldshay, however, some prime animals are yearly made quite fat with hay, straw, turnips, and about a quarter of oats to each.

Sheep.

Until the beginning of the present century there was only one breed of sheep (*Ovis aries*) in the islands. This breed seems to have sprung from the same stock with those of Iceland, the Faroes, Shetland, and the Highlands of Scotland. Some of the original type still exist in North Ronaldshay, like the stragglers of a vanishing race, but even in this remote island the breed has been much improved by better food and increased attention.

Originally the sheep were of a very small size, rarely exceeding 4 to 6 lbs. per quarter, with very short bodies and legs, long necks, tails about three inches in length, with white or gray faces, and few having horns, and their fleeces—which were mostly fine in quality—seldom averaging over 1½ or 2 lbs. in weight. Their flesh, in general, was not esteemed pleasant, owing, no doubt, to the precarious nature of the pasture, being coarse, dry, and dark in colour, and bearing a strong resemblance to venison. However, when fed on sweet and nutritious grasses, the flesh, both of the sheep and lambs, is said to be delicious, while the clip averages 3 to 3½ lbs. each, thus plainly proving the truth of the old maxim, which says that "the wool goes in at the mouth." Much has been done to improve the breed of sheep. About the year 1808 Malcolm Laing, Esq., late M.P. of the county, introduced merinos upon his property, in the island of Eday, by purchasing the late Chief-Baron Montgomerie's flock in Tweeddale, and a couple of rams of the Swedish merino. The wool of these grew much finer in texture in the islands of Orkney, and the clip of the pure merinos averaged as far as 4½ lbs.; the merino-Cheviot, 3 lbs. 7 oz.; and of the merino-Orkney, 3 lbs. 6 oz. Cheviots were introduced by Mr Archer Fortescue upon his estate at Orphir, and his success caused other enterprising men to follow his example. The old Orkney breed has been variously crossed with the merino, Cheviot, long-wool, Southdown, and Leicester breeds, but Leicester-Cheviots now seem to be the favourites with most of the farmers. Where flocks are kept for breeding purposes, Cheviot ewes are generally obtained in the first instance, and these are crossed by pure-bred Leicester rams, which are purchased from flocks of good repute, at prices varying from 5 to 20 guineas. In a few years, by continual crossing with Leicester rams, the breed becomes too fine, when the whole flock is usually sold off, and a fresh start again made from Cheviots.

The breeding ewes usually average 1½ lambs each, and great pains are bestowed both upon the ewe and her progeny in the breeding season. Indeed, many farmers place the sheep under cover every night in winter, giving them a plentiful supply of straw; and in the daytime, turnips are thrown to them upon the pastures. An extensive farmer in Mainland says that housing at night prevents foot-rot; but should this troublesome disease break out, he loses no time in applying a salve composed of the following ingredients—viz., verdigris, vitriol, honey, and lard, in equal quantities, with as much butter of antimony dropped in as will form a nice paste. It is not unusual for lambs to sell at from 20s. to 30s., the prices having been gradually advancing for many years. On one or two farms, where the soil is dry, small flocks of sheep are fed after the system prevalent in the south of Scotland—viz., that of folding upon the turnips, whereby the land is much improved; but the practice is far from being common, most of the turnip crop being drawn off as required.

Horses.

There is no doubt that the original breed of horses found in Orkney were of a diminutive form, similar to those of Shetland at the present day, and it is likely that they came from the northern parts of Europe. Indeed, in shape, size, and colour, they differed very little from the Norwegian horses for a long period. At the beginning of the present century, however, most of the horses in Orkney were much larger, being descended chiefly from the class of animals kept in the northern counties of Scotland—Caithness and Sutherland. It was the custom for farmers to buy yearlings from those counties; and so extensively was this carried on that, even in those days, 2000 per annum were imported. About twenty to thirty years ago farmers became more fully alive to the importance of obtaining really useful animals, and to this end the native *garron* was crossed with Clydesdale and other heavy horses. The breeding of horses is now a strong feature in Orkney farming, and animals produced by the cross above named are powerful, full of action, and remarkably docile and hardy. Yearlings now sell at from L.10 to L.20; two-year-olds at from L.20 to L30; and good horses in the prime of life bring as far as L.50 to L.60. Few are now imported, being chiefly confined to now and then one for breeding purposes; indeed, thé "estimated abstract of export" returns for a few years past show that the *export* trade is gradually assuming vast dimensions. On most of the large farms many of the horses kept are Clydesdale crosses, but on some of the small holdings crosses between the Orkney garron and Shetland pony are in common use. An occupier of over 700 acres in Pomona says :—

> "The horses generally are a mixed breed, between the original Orkney horse, known as the *garron*, and the Clydesdale and other heavy Scotch entire horses. Those employed on my own farm are nearly pure-bred Clydesdales."

An extensive farmer in Rousay, writing on the same subject, says :—

> "We have many different breeds of horses: (1.) Shetland ponies; (2.) Crosses between the Shetland pony and Orkney garron; (3.) Orkney ponies, strong and useful animals; (4.) Crosses between the garron and Clydesdale; and some further bred still."

A farmer in Westray writes :—

> "Horses are of various breeds on small farms in this island. The Orkney garron is used, which is a hardy animal, from 14 to 15 hands high. On large farms the Clydesdale is extensively used, but still too little attention is paid to the breeding and rearing of first-class descriptions, considering the demand. When a good animal is wanted, it is scarcely possible to obtain one."

Another occupier in Rousay asserts :—

> "We have a mongrel breed of horses, between the Clydesdale and Orkney garron."

Pigs.

The breeding and feeding of pigs are carried on to a considerable extent in some parts of the Orkneys; but, from the great variety of crosses, it would be extremely difficult to determine to what class many of the prevailing breeds belong. It must, however, be acknowledged that, within the past twenty years, they have been much improved, for, in place of the small, arch-backed, wiry-haired, awkwardly-shaped native swine, is now to be seen a fine-boned animal, with great length of body, extensive width of shoulder and rotundity of carcase, and with aptitude to fatten at an early age. The native pigs certainly had some redeeming qualities; their flesh was much esteemed for delicacy of flavour, and had the animals not been so much neglected, their ungainly appearance would not have been so striking. In winter and summer alike they were allowed to roam at large in the fields and on the commons, and they often suffered very much from cold and hunger. The original breed has been so much crossed by animals from the mainland of Scotland, that very little of the native blood is in the veins of the existing species. The practice with regard to feeding pigs, on the generality of farms, is to allow them to run on the pastures in summer, giving them very little more than the offal from the dairy and kitchen-table; but in winter they are kept in the styes and fed with oatmeal or bere meal and potatoes, until they are fit for the butcher, and the weight of the carcase when dead ranges from 15 to 20 stones.

Poultry.

Barnyard fowls are of various kinds—geese, ducks, and the common hen being the principal. Of geese, large quantities are still reared on the moorland; but as reclamation extends, the numbers are gradually falling off. Eggs used to be remarkably cheap, but the facilities now afforded for export have more than doubled their value.

Implements in Use.

In the Orkney Islands, where, until within a few years back, the arable land was extremely limited in extent, the variety of implements applied to agricultural purposes was not so great as in many even of the northern counties in the mainland of Scotland; within the last ten or twelve years, however, some of a superior description have been introduced,—among those particularly deserving of notice being the iron plough, the subsoil plough, the cultivator, various kinds of iron harrows, turnip-scarifiers, corn-drills, mowing-machines, reapers (both manual and self-delivery), tedders, and many other useful implements. Of fixed machines, the principal are the thrashing-machine and corn-mill, driven almost exclusively by water or horse-power. The original Orkney plough, which has been described as a "bent piece of wood with three iron teeth," has not been in general use for fifty years. It was superseded by a wooden plough with two stilts and pointed with iron—an implement which, at the time, was thought to work very efficiently. The price of this implement was 25s. to 30s. About twenty-five years ago an iron plough was brought to Sandwick by Mr W. Watt, and farmers came from all parts of the islands down to Skaill to examine it. Several of the most enterprising soon furnished themselves with iron ploughs from some of the eminent makers of that time, and at the present day these implements are in general use throughout the length and breadth of the land. The plan of ploughing with three or four oxen was gradually abandoned, so that now rarely more than two horses are yoked, and the ploughmen perform their work very creditably. Still, here and there, in the spring of the year, the tenant of a small holding may yet be seen tilling his small patch of ground with a very primitive-looking wooden plough, drawn by a pair of refractory oxen, or, sometimes, one ox and an Orkney garron.

The introduction of various sorts of cultivators, harrows, and scarifiers, has also facilitated farm operations in a remarkable degree; for, not only are the lands more thoroughly cleansed and brought into a satisfactory state for cropping, but the work is so much more readily performed that the crops can be put down in due season.

As I am now treating of the improved implements in common use, I can scarcely forbear mentioning that the reaping-machine has already been introduced upon almost every holding of large or medium size. Any one would naturally imagine that the sickle would have been cast aside very slowly in a district so remote as Orkney; but the opposite being the case, it is clear that men are becoming alive to the fact, that in order to farm profitably, they must keep pace with the times in which they live. The machines used are of various constructions, but all are modelled, so far, after the invention of the Rev. Patrick Bell, whose reaping-machine, in 1826, was merely regarded as a toy by the "knowing ones." The exhibition of a reaping-machine by our transatlantic brethren, at London in 1851, no doubt opened the eyes of many of our farmers in regard to cutting down grain by machinery.

Size, Rent, and Tenure of Farms.

The farms in Orkney are of various sizes, from six or eight acres to several hundreds, and are principally occupied by the proprietors themselves, or let to tenants, few being now sub-let to tacksmen. There are still many holdings which fall under a rental of L.10 per annum. some of them having been under cultivation for generations, others again having been reclaimed from the moorland or hill-common, which is everywhere rapidly giving way to cultivation. Rents range from 5s. to L.600. The returns of the county surveyor for 1865–6 show that the estimated number of farming occupiers in the Mainland is 1909; in the South Isles, 745; in the North Isles, 1005; giving a grand total of 3668. There are 754 holdings with a rental running from L.10 to L.20; 398 from L.20 to L.50; 106 from L.50 to L.100; and 49 with a rental of above L.100. Nearly all the small farmers are tenants-at-will, holding their farms from year to year, the term of expiration being Martinmas; but many of the better class farms are now held by lease. When leases are wanted, they are seldom refused by the Earl of Zetland and other extensive proprietors; yet a few of the occupiers prefer to be tenants-at-will, rather than ask for a lease, and be restricted as to the course of management, with perhaps an advance of rent. And I may here mention that rents have gone up very much of late, proprietors invariably asking an increased rent at the termination of the lease; but in some cases the increase is deducted for improvements, year by year. These improvements relate to building, fencing, draining, reclamation, and road-making, the operations being carried out under the eye of the factor. Leases are granted for various terms—7, 9, 11, 14, 19, and 21 years; the 7 and 19 years' leases being most common. Unlike the formidable documents in use in some parts of Scotland, the leases are simple and generally effective. For many years the subject of tenant-right has been provoking much discussion in both Great Britain and Ireland, and it certainly does appear nothing more than just that a clause should be inserted in each lease, guaranteeing a fair remuneration to the out-going tenant for all inexhausted improvements, whether in drainage, building, roadmaking, or manures "locked up in the soil" However desirable it may be to secure to the landlord a fair annual rent for his estate, and its surrender to him in as good condition at the expiration of the occupancy as at its commencement, it is equally desirable that a tenant who possesses skill, industry, and capital, should have secured to him, as far as possible, a fair return for labour and money employed. Where such security does not exist, the free flow of capital to the soil is prevented, and a premium is actually held out to the farmer, in an indirect manner, to leave off manuring and cleaning the land towards the end of the lease, lest the rent should be raised, or his improvements go to the benefit of another occupant. Allowing the land to run out of condition towards the end of a lease, is what the Scotch farmer calls "whipping the land when near the out-stretch of the tether." Such a system takes the incoming tenant, whoever he may be, five years to restore the fertility of the farm ; therefore, the productive powers of the lands are lost to the community for eight years, in consequence of a tenant having no security for his investment. And yet I have confidence enough in the landlords to believe, that the want of proper leases does not arise from any desire to take undue advantage of their tenants, but more from inadvertence or inattention to these and similar matters. Factors ought to act as mediators, and lay feasible plans before them, in order that they may be led to give such important matters serious consideration. An excellent plan, in my opinion, is for the landlord or his factor to relet the farm to the occupier, if desirable, at least two or three years before the expiration of the current lease. On the above subjects I quote the following statements and opinions furnished by landlords, factors, and farmers from several of the islands of Orkney:—

From the island of Westray, No. 1 :—

"I have a 19 years' lease ; indeed, most of the farmers on an extensive scale have leases of from 15 to 21 years. Proprietors rarely grant them to tenants whose rents are under L.20 per annum."

From the island of Rousay, No. 1 :—

"Leases are given in almost every case. The length of the leases granted to the tenants on the smaller holdings is generally 7 years, and on the larger farms 19. When the lease is only for a term of 7 years, the tenant usually gets one-third of his rent deducted for improvements, but he is expected to build or drain to the amount. In some cases the proprietor furnishes capital for the improvements effected on the larger farms, and the tenant pays 5 or 6 per cent. for the money advanced."

From the south of Pomona :—

"There are many instances of 7, 14, and even 21 years' leases ; and when these have been granted, the tenants certainly appear more industrious, and the landlords more generous. The good feeling which is said to exist between the majority of landlords and tenants has been much strengthened by the granting of leases, and at no distant date I am convinced that year-to-year occupancies will be the exception."

From the island of Rousay, No. 2 :—

"About 25 years ago a few of the tenantry had leases of 19 years, while many had none at all, but were tenants-at-will. However, about 18 to 20 years ago most of the tenants obtained leases for a term of 14 years, many of the rents being raised 50 per cent. ; for example, a tenant paying L.14 had his rent raised to L.21. They, however, had the extra rent handed over to them to be laid out on improvements, such as draining, ditching, building, &c., but, of course, they had to pay interest for the money so expended. In one of the islands belonging to the parish, the tenants got leases for 21 years, with a rise of 15 per cent. every 7 years. Those farmers got one-third of the rent deducted for the first 7 years to lay out in improvements, the factors seeing that such improvements were carried out. Nearly all the leases given of late are for 7 years only."

From the island of Westray, No. 2 :—

"Farms are mostly let for 19 years. All of the large occupiers have leases: some of the smaller have also. I have seen many of the leases granted to occupiers of small farms, which are short, simple, and effective. Still, the majority of small farms are held from year to year."

From the island of South Ronaldshay :—

"Leases are given if inquired for by the tenant, of duration as may suit all parties concerned: the general term is 19 years. The greater number of farmers in the island have small holdings—under 50 acres—and are tenants-at-will, preferring to be so rather than ask a lease, which may perhaps be attended by an increase of rent."

From the island of Sanday :—

"Within the past 10 or 15 years many leases have been granted to tenants, the common term being 14 years. Yet there are still many farmers who hold their lands from year to year, either through prejudice to being 'bound up,' or through fear of an advance of rent. I believe that, generally, where leases have been granted, rents have been raised."

Rate of Wages.

The rate of wages differs with the districts, in some more money being given, and a less quantity of meal, milk, &c.; but when all things are taken into consideration, there is very little difference, inasmuch as higher wages in one part of the country than another would cause labourers to migrate, as it were, from place to place. The following, with slight modulations, are the rates of wages paid throughout the islands :—

1. A grieve or farm bailiff receives from L.20 to L.22 per annum, with house, fire, sixty to seventy stones of oatmeal, three to four barrels of potatoes, and a cow kept to supply his household with milk and butter.
2. A ploughman receives from L.13 to L.16, with house, fuel, meal, and potatoes, as above, and an allowance of two quarts of sweet milk per day.
3. A general servant's pay varies from L.8 to L.15, with extras similar to those received by ploughmen.
4. Dairy women receive L.7 to L.8, with extras.
5. Under do. receive L 5 to L.6, with extras.
6. General domestic servants (women and girls) are paid at the rate of L.5, 10s. to L.6, 10s., with extras. Married men have each a house, but single men usually live together in a bothy, with a woman to prepare their victuals.
7. Unskilled day labourers are paid at the rate of 12s. to 13s. per week, and in some cases as far as 15s.
8. Labouring women and girls are paid 9d. to 1s. per day for gathering weeds, hoeing potatoes, thinning turnips, and cutting thistles. Day labourers of this class are now extremely scarce, and wages have lately advanced from 6d. or 8d. to 9d. or 1s.

9. Extra hands for the harvest are paid L.2, with one stone of oatmeal per week, and half a gallon of milk daily.

10. Women employed as harvesters receive L.1, 10s., with an allowance of meal and milk similar to the men.

As a rule, the labouring classes seem contented and happy. I visited several families, and met with the greatest civility, and not a murmur escaped the lips of any one with whom I held converse. Entering a house early one morning, I found the family devoutly engaged in morning prayer, and was much pleased with the attention paid to the reading of a portion of Scripture, and also to the explanation I gave, by request of the mistress of the house. The Sabbath-day also is much observed by the humblest of classes. In the bothy the style of "housekeeping" has been much improved by a woman being employed to cook and make the beds. All the labourers speak very respectfully of their masters, and I found that they often continue for many years in the same employment, especially married men; and it is extremely interesting, speaking well for master and servant, to see men and women who have been in the same service twenty to thirty years, and their children growing up to take their places.

The ploughmen are very skilful at their work, and in the spring of the year "straight lines" and "well-laid-up arridges" form the usual topics of conversation when two or three meet together. Many of the turnip fields are also regularly singled, potatoes well hoed, and weeds cleared off the land; indeed, the attention paid to farm work in some districts gives to the whole landscape a neatness and finish which arrest the attention, and win the admiration of every beholder. The following extracts, from written statements made by some of the leading agriculturists of Orkney, will give a tolerably accurate idea of the rate of wages in different parts of the islands:—

From the parish of Sandwick (Mainland):—

"Wages are paid per annum—viz., farm servants from L.10 to L.16, with house, fire, sixty stones of oatmeal, thirty to forty stones of potatoes, and two quarts of sweet milk daily. Married men have each a house; single men live in a bothy, with a woman to cook for them and make their beds. Dairy women are paid L.7 to L.8, with allowances as above. Grieves have L.22, with meal and potatoes, and a cow grazed for them in summer. In winter they sometimes have an allowance of sweet milk from the farm dairy. Day labourers receive 12s. to 15s. per week. Women were paid 1s. per day last summer (1872)—formerly 9d.; indeed, all wages are rising. Women are very scarce for out-door work; in fact, nothing like the requisite number can be had for singling turnips. Farmers are, therefore, often compelled to put their horses idle, and employ the ploughmen as turnip thinners—a very expensive method."

From the parish of Birsay (Mainland):—

"Formerly we could obtain any number of extra hands (women) for 8d. to 9d.—now we pay 1s. per day. Men range from 20d. to 2s. 3d, that is, unskilled labourers. Farm-servants are paid from L.13 to L.15, with fifty to sixty stones of meal, half a gallon of milk daily, and what potatoes are required. A grieve obtains from L.18 to L.20, and a ploughman from L.15 to L.18, with the allowances I have already named."

From Brough, north of Westray:—

"Labourers' wages were formerly 2s. per day, but now a good hand gets as high as 2s. 3d. to 2s. 6d. Ploughmen get at present L.12 to L.15 in money, six bolls (60 stone) of meal, one Scotch pint of sweet milk daily, two tons of coals or peats, and potatoes, with house and garden. Some farmers pay as high as L.18 per annum for a foreman or grieve."

From Bow of Rapness, south of Westray :—

"Farm-servants receive annually from L.8 to L.12, with sixty stones of oatmeal, five barrels of potatoes, and half a gallon of milk (daily). Harvest hands (men) L.2, with one stone of meal per week, and two quarts of milk each day. Women, as sheafers, L.1, 10s., with meal and milk, and children, as bandsters, from 15s. to L.1, with meal and milk."

From Laingskaill, north of Rousay :—

"The wages we pay to labourers are from 1s. 8d. to 2s. 6d. per day; roadmen are paid 10s. a week; masons, from 2s. to 2s. 6d. per day; ploughmen, L.14 a year, with rations—*i.e.*, meal, milk, and potatoes; servant-girls from L.5 to L.6 a year; and turnip hoers, 10d. per day."

From Trumbland, south of Rousay :—

"Farm-servants (men) just now get from L.10 to L.14, and female servants from L.5 to L.7 per annum. Day labourers receive from 1s. 8d. to 2s. 2d. per day. Female hirers from 9d. to 10d. per day, finding their own food. In addition to the sums named above, those engaged by the year have an allowance of potatoes, meal, and milk."

From Newark, Sanday:—

"Labourers' wages (men) from L.12 to L.14, with meal, milk, and coals; women, from L.5 to L.6, with bed and board. For day work, we pay 1s. 10d. to 2s. 2d. for men; for women, 10d. to 1s."

From Grutha, South Ronaldshay :—

"For first-class ploughmen, we pay from L.14 to L.15 per annum, with meal, fuel, milk, and potatoes, the quantities of which vary on almost every farm. Female servants get from L.7 to L.10. Day labourers receive 2s. to 2s. 6d. per day; girls hoeing turnips, 10d. to 1s."

Statistics.

To illustrate the cultivation of the Orkneys, I give the following returns of produce, &c., published by the Board of Trade, contrasting, where necessary, with the crops of by-gone years. The total acreage under all kinds of crops, including bare fallow and grass, is 89,009, of which grain occupies 34,645 acres. Very little wheat is grown, the small parcels put down being mostly for experimental purposes. Bere to oats stands in the proportion of one acre to four throughout the islands. The green crops cover 14,540 acres—10,712 of which are devoted to turnips, and

3420 to potatoes, the remainder to mangolds, carrots, tares, &c. 22,442 acres are under clover, sainfoin, and grasses, and 16,302 acres are in permanent pasture, not broken up in rotation, and exclusive of heath or mountain land. The population of Orkney is 31,241, and the estimated value L.60,283, 2s., according to the particulars given in the following table :—

	Population.	Value		
Total of Mainland, . . .	13,171	L.28,197	14	6
Total of South Isles . .	5,337	6,960	8	0
Total of North Isles, . .	9,299	18,113	14	0
Burgh of Kirkwall, . .	3,434	7,011	5	6
Grand total, . . .	31,241	L.60,283	2	0

In order to show the progress which agriculture has made within a few years, I may notice that the aggregate breadth under a rotation of crops in 1856 amounted to 25,572 acres, against 89,009 in 1871–2, although it is but fair to state that "return papers" were not then furnished to the farmers upon very small holdings. In the year I allude to, the turnip crop covered an extent of 3438 acres, whilst the crop of the past year occupied a breadth of 10,712 acres.

As statistics are generally regarded as "dry reading," I presume I have already brought forward enough to show the progress which reclamation and rotation of cropping have made; and now that farmers have become fully alive to the great benefit to the community at large, when "two blades of grass are made to grow where only one grew before," it is to be hoped that the various landed proprietors will give them all the support and encouragement which they possibly can, in order that they may increase in prosperity, the condition of the labourer be bettered, and the face of the country be made to "bloom and blossom as the rose."

Improvements within the last 25 years.

I may observe that with reference to the question as to what improvements have taken place within the last quarter of a century, many of those which call for particular notice have already been mentioned in the foregoing remarks; I may, however, give a few additional particulars when required under the various headings.

1. *Drainage of Land.*—Although much ground still requires to be operated upon, yet since the year 1847 a great breadth of infield land has been thoroughly freed from water, and is producing satisfactory returns under the ordinary rotation, while large tracts of moorland have been wholly "reclaimed from the desert" by means of underground passages for the water, and after-tillage, and are now producing fine crops of turnips and

corn, in place of being the home of frogs and tadpoles. From information received, and minute personal observation, I calculate that upwards of 18,000 acres, or one-fifth of the whole extent under rotation, has been drained within twenty-five years. At the present time little is being done, but several intend commencing operations in the forthcoming winter.

2. *Rotation of Cropping.*—As I have elsewhere fully dwelt on the benefits of a regular course of cropping, it will now only be necessary to mention that a perfect rotation has been entered into by the majority of farmers within the past twenty-five years, which seems suitable to the climate and quality of the soil; and the benefits of such a system are already apparent in the heavy crops of turnips, oats, and bere which are grown on every well-regulated farm.

3. *Squaring of Farms.*—The redistribution of lands laid the foundation of all subsequent improvements in Orkney. It not only gave the death-blow to many bad customs and gross abuses, but also afforded encouragement to occupiers to improve the condition of the soil. While the *runrig* system prevailed, farmers seldom thought it worth while to effect improvements, scarcely knowing who would reap the benefits accruing therefrom. Since the "squaring" and "planking" processes have been carried out, farms have been enlarged, steadings built, marches straightened, rotation of crops become general, superior breeds of cattle, sheep, and horses introduced, and, most of all, the condition of the farmer has been improved. Although Mr Robert Scarth of Binscarth was one of the first to move in the squaring and remodelling of farms nearly forty years ago, yet the plans have mostly been carried into effect within thirty years; and notwithstanding that the operations then performed scarcely fall within the limits of this essay, I have thought it quite necessary to mention them, inasmuch as they paved the way for many of the improvements I have already noticed.

4. *The use of Artificial Manures.*—In order to keep the land in good heart, of late years much has been done by the aid of artificial manures, the principal kinds used being guano and bones. Top-dressing is carried on to a great extent, especially on the oat crops, and the increased yield fully remunerates the farmer for his outlay. Guano is much used for turnips, and bone-dust is now and then applied to the permanent pastures. Speaking of lands with thin surface soils, Dr Watt of Kierfiold House says:—"Such land, in my opinion, has in many cases been almost laid waste by the use of Peruvian guano year after year. I have always used the bone manures, and my land is yearly improving."

5. *Growth of Turnips.*—One of the greatest improvements which have taken place in Orkney since the year 1847 is the

more extended cultivation of the turnip, and it is almost solely within the last ten or fifteen years that its value has been fully appreciated. In 1855 the turnip crop only covered an area of a little over 3000 acres; at present three times the extent is devoted to this important crop. It is now looked upon as the mainstay of the rotation—the basis upon which all the other crops depend. Indeed, too much cannot be said in praise of this valuable root, especially when the culture is properly attended to, when the ground is thoroughly worked and well manured, good seed sown, and the crop kept perfectly clean by scarifying and hand-hoeing.

6. *Implements.*—Since the old Orkney one-stilted plough was cast aside, farm implements of a superior kind have become general, and at the present time farmers are gradually introducing first-class implements to till their land, and as gradually dispensing with all the rude instruments of ancient agricultural warfare.

7. *Breeds of Horses, Cattle, and Sheep.*—I have already dwelt at some length on the marked improvement in the breeds of horses, cattle, and sheep, and need do no more here than draw attention to the extraordinary increase in value in most of the animals by the introduction of good blood and judicious crossing.

8. *Granting of Leases.*—Within the past few years most of the extensive farmers have had leases granted, and these have generally done much to promote agriculture, as many contain clauses obliging tenants to effect improvements in draining, building, &c., a portion of the rent being set apart for the purpose. Independent of this, there are few connections of a more important character than that of landlord and tenant. A good understanding is essential to the prosperity and happiness of both; the former is guaranteed that his property will not suffer by successive over-cropping, and the latter knows that he will at least have a chance of reaping the fruits of his industry and expenditure of capital.

9. *Reclamation of Waste Lands.*—Hundreds of acres of hill-common have lately been broken up and converted into arable land of fine quality. This, however, can only be accomplished by those who have plenty of horses at command, as, to perform the work properly, the plough should be drawn by four or five strong animals. Every furrow ought to be followed up by the subsoil plough, breaking up the pan as much as possible to allow of the water escaping into the drains. While I do not expect to see corn growing upon all the high lands of Pomona, nor turnips upon the cliffs of Hoy, yet I believe that at no distant day all the available land in the islands of Orkney will be devoted to the production of food for the people.

10. *Formation of Roads.*—Nothing has tended more to increase the comfort and prosperity of the Orkney farmer than the forma-

tion of good "permanent" ways through the islands. Since the passing of the Orkney Act in 1857, and the construction of roads, trunk and branch, which immediately ensued, land has increased very much in value, and intercourse has been much facilitated. 104 miles of properly formed roads have been constructed in the islands—57 in Mainland, and 47 in the smaller islands. Many of the private ways are still, however, in very bad condition, and in wet weather are almost impassable.

With regard to the improvements which have been carried into effect within the last twenty-five years, I subjoin the following extracts of reports received from proprietors, factors, and extensive farmers residing in various districts of Orkney :—

From Westray :—

"Within the past twenty-five years great improvements have been made in reclaiming, draining, and fencing, and with a good system of cropping and a better breed of every class of stock, farmers now get on pretty well."

Another report from Westray :—

"Twenty-five years ago there was very little sown grass ; no rotation, properly speaking ; very few turnips grown ; and no extra manures used The system of cropping was :—1st year, bere ; 2nd, black or gray oats ; 3rd, bere, &c.—bere and oats time and time about, with here and there a small patch of potatoes. No scythes or reaping machines to cut corn—nearly all done by the serrated sickle. Farm-servants received L.5 to L.8 per year ; women, L.3 ; harvest hands (men), 25s. ; women, 15s. No iron ploughs, and very imperfect wooden ones. Sheep small, weighing 20 to 30 lbs., and ran at large upon the hills. Two-year-old cattle sold at L.2, 10s. to L.3 ; now they sell at L.10 to L.15. A portion of farm rents paid in kind—viz., one half in money, and the rest in corn, butter, fowls, oatmeal, malt, and oil, where fish were caught. Little care was taken to make the butter sweet, as the quantity was made up irrespective of quality, and I really believe the dairy women then learnt habits of carelessness which they have never forgotten, as our butter is neither noted for its richness nor pleasant flavour. This year I got 30s. each for my Leicester Cheviot lambs, L.15 for my two-year-old cattle, and L.26 for a young mare, which will give you an idea how much things have changed for the better. There were no good roads in the country ; now we have good hard roads through every parish and island, but we have to pay for them pretty well. We are assessed at 1s. per pound for the landlord, and the same for the tenant ; but we do not grumble, as a good road is the greatest improvement that can possibly be made. We have also a steam-boat twice a week through the North Islands, which has raised the price of all farm produce down to eggs. They are now 9d. per dozen, and I well remember selling them at six for a penny. I also remember the time when servants' wages were 50s. per year, but we are now as able to give L.12, as we are getting L 12 to L.15 for a two-year-old steer or heifer, which my father would gladly have sold for L.2 or 50s."

From Burray :—

"Much ground has been drained, according to the size of the island. I have reclaimed 20 acres of waste land, or common, on my own account, and the tenants throughout the island have improved their holdings in a similar way. I have a nineteen years' lease, and there are about eight or ten more in the island for a similar term. Vast numbers of pigs are raised for exportation, and so with poultry and eggs."

From Sanday :—

"In no island in Orkney has a greater proportion of land been reclaimed than in Sanday. Much drainage has also been done, but more yet is needed. We still feel a great want of a market for grain and stock, although we can now do a good deal in the way of exportation."

From Rousay :—

"Hundreds of acres of land have been reclaimed, and, in many cases, enclosed with stone dykes. New steadings have been erected; and instead of the miserable buildings with thatch roofs, we have many nice cottages and comfortable dwellings. We are getting a new pier this season, which will supply a want long felt. Our communication with Kirkwall is twice a week now, by means of sailing packets, and this is a wonderful help to trade."

Another report from Rousay :—

"Some farms have been doubled or trebled, by reclamation of waste lands, within twenty-five years, and many small holdings taken out of the hill, where formerly there was nothing but stunted heath. The rent of arable land is now from 12s. to 22s. per acre. The principal proprietor occupies a large farm himself—chiefly for sheep—in one of the most fertile parts of the island, the value of which is about L.400 per annum. The tenantry on that part of the island belonging to Dr Baikie of Tankerness have nineteen years' leases, but much property belongs to Colonel Burroughs, of the 93rd Sutherland Highlanders."

From South Ronaldshay :—

"There has been a great change for the better within the last twenty-five years, I may safely say, in everything connected with agriculture. We have good roads through the island; houses are loftier and more comfortable, the thatch roof giving place to slate; proprietors are helping their tenants to build by paying a portion of the expenses, and draining and reclaiming are the order of the day. As to implements, reaping-machines are almost general, a wooden plough the exception; ploughing with oxen almost out of date; and small farmers, who cannot afford a thrashing-machine to be driven by horses or water-power, are getting hand-thrashing mills, and thus the flail is laid to one side either as useless lumber or as a relic of the past."

From Mainland :—

"A large extent of waste land has been brought into cultivation within the last twenty years, at a great expense in labour and manure, the whole surface having formerly been pared and carted away, leaving little or no decayed vegetable matter in the soil. Such land, taken in by the small farmers, I find does not pay, not having horse strength enough to subsoil, without which they can only penetrate to a depth of about four to six inches. My practice is to follow the ordinary plough, which takes as deep a furrow as possible, with a subsoil plough drawn by four or six horses. It is wonderful how the soil mellows down in a few years when constantly exposed to the beneficial influences of the atmosphere. Reaping-machines are in general use, even on small farms; fixed thrashing-machines of two to four horse power on most farms. One of my machines is driven by water—six-horse power—the other by nine horses. Artificial manures are also in general use, and farming is, year by year, being reduced more to a science."

Enough, I trust, has been advanced to show that, in many respects, the agriculture of the Orkneys has been much improved within the past twenty-five years; and from what I have been able to glean from the farmers themselves and from actual observation, I doubt not that nearly all are desirous of effecting still further improvements, so far as they have power; but something more than energy and skill on the part of the tenant is wanting before farms can be conducted on a model principle; the occupiers require sympathy and support from their landlords, and there never was a period when they stood more in need of assistance and encouragement than the present.

I may mention that there are still many hindrances to the progress of agriculture, the following being among the principal:—

1. Want of sufficient capital.
2. Want of proper farm buildings.
3. Smallness of farms.
4. Want of leases.
5. Insecurity of tenure, and lack of compensation for unexhausted improvements.
6. Want of proper fences.

As to lack of capital, it is the prevailing opinion that on many large farms, even in the most fertile districts of the mainland of Scotland, it is a great hindrance to agricultural prosperity. Seeing, however, that "monied men" are entering the field year by year, there is less ground for complaint, and it is to be hoped that in time, when a drain is desirable or a fence would be an improvement, the necessary funds will be available.

The landlord should, as far as possible, endeavour to remedy any defect in buildings; and many seem to have had their energies aroused already, inasmuch as nice slated dwellings and outhouses are springing up here and there, but still many farmers have to put up with dwellings of a very inferior character. One landlord—who, I trust, is an exception—when asked to improve his tenant's habitation, replied—"Oh, no! we let the land, not the buildings."

Farmers on a small scale rarely make great progress. They cannot afford to purchase manures and implements sufficiently good and abundant for high-class farming, and living, as it were, from hand to mouth, they often sell the produce of the farm to a great disadvantage.

Touching the want of leases, I have previously dwelt on the subject pretty fully, because it stands to reason that yearly tenants cannot exercise the same control over their holdings as if they had them secure for a number of years.

It is only fair, when a tenant makes an improvement of a lasting character, and is obliged to leave it at the expiration of his tenancy, that he be partially, if not indeed fully, remunerated for the trouble and expenses involved, and in like manner with respect to unexhausted manures in the soil, which go to the benefit of his successor, whoever he may be.

The want of fences is a great drawback to progress. Herding is tedious, expensive, and unsatisfactory, and tethering a wearisome process. On every small farm tethering has to be resorted to; horses, cattle, sheep, and swine, are all fastened by means of a collar, to which is attached a chain of 6 to 7 yards in length, and fitted up with an iron pin at the end, which is firmly driven into the ground. And yet there is something very "homely like" in seeing a farmer's whole stock quietly grazing in front of his dwelling, and his guidwife come out at mid-day to "change the tether." To resume; I do not for a moment believe that want of fences is a necessary evil, for in spite of the humidity of the climate, and the proximity of most of the land to the sea, various kinds of shrubs would not only live, but would thrive amazingly, if properly planted and well cared for. An experienced forester would find no difficulty in naming the varieties of shrubs most suitable for fencing in such a climate, and whoever gives the information will indeed be a benefactor to the community at large. Further, in my opinion, nice belts of trees might be raised here and there, which would be of much value for shelter for the out-lying stock, and, if they were planted with taste, would have a happy effect, and be highly ornamental to the country landscape. As material is everywhere abundant, stone fences might also be raised to enclose the fields, say from 2½ to 3 feet in height, exclusive of the coping, or top stone, set on edge. At the present rate of mason's wages, a wall of this description could be raised at an outlay of 7s. 6d. to 8s. per chain of 22 yards, excluding the cost of quarrying and carting stones, which might be done by the farm hands in their spare moments. Again, in many parts of England the mountain heaths or sheep-runs are enclosed by means of a light wire fence, which, when properly managed, forms a good division, is durable, and inexpensive. The fence alluded to might be introduced with benefit.

Before concluding this report, I cannot refrain from remarking what an immense advantage would accrue to farmers, in the reclamation of land especially, were cultivation by steam introduced. By steam-power the ground would be more deeply cultivated, the growing crops would get the benefit of a well-stirred subsoil, and all undue pressure would be taken from the horse. By its aid whole tracts would be put under a course of cropping, which before grew nothing but heath, and by its help the fertility of all the infield lands would be increased, and in the autumn of the year large breadths of land would be yellow in the setting sun with golden crops of grain, instead of being red with the abundant display of "blooming heather."

ON THE STEM AND BRANCH PRUNING OF CONIFERS.

By Robert Hutchison of Carlowrie, Kirkliston.

[*Premium—The Minor Gold Medal.*]

One of the most difficult among the many varied duties of a forester's occupation, and probably so because it is but imperfectly understood, is a judicious system of pruning conifers. Indeed, until recent times, the use of either knife or chisel upon pine or fir was wholly unknown, and believed to be deleterious rather than beneficial to the whole species. Since the introduction, however, of so many new varieties of coniferæ, and their use and culture primarily as ornamental specimens, a change in the opinions of many who have practical skill in their treatment has been gradually taking place, as regards the good or evil results of judicious pruning. The now generally adopted system of "disbudding," (which is pruning in its most literal and primitive sense, inasmuch as it aims at *preventing* the growth of any irregular arm, or branch, or terminal shoot, rather than at cutting it off after it has been allowed to disfigure the tree), is at once the simplest and best mode of procedure in regard to all coniferous varieties. It is, however, applicable chiefly, if not wholly, to young plants, and other systems are sometimes necessary when the plant requiring regulation has been either neglected in its younger life, or become the victim of accident; and it is in such cases as these that the two systems of pruning referred to in this paper, viz., stem and branch pruning, become sometimes necessary.

Considering that great caution is requisite in pruning coniferæ generally, and that some varieties will not stand even a moderate application of the knife, it may be safely stated that in the majority of instances *branch pruning*, or "*fore-shortening*," as it is frequently termed, is preferable to the more severe system of cutting branches off close to the stem, or "stem pruning."

It must be remembered that the chief aim in pruning is to throw an additional weight of timber into the trunk of the tree, where it is practised upon trees planted for utility and profit; but where it is necessary for trees planted with a view to ornament, or as specimens merely, the principal object in view is to induce a symmetrical habit and form of growth, and hence it may be assumed that the principles as regards pruning are necessarily different. This, however, is not the case. Trees grown, whether for ornament and pleasure, or for profit, ought to be treated in their younger years upon the same principle as regards pruning; and until they arrive at an age of about twelve years, the treatment ought, physiologically speaking, to be identical.

If grown *for profit*, the chief object in pruning trees is the promotion or development of timber in the bole; while in growing trees for ornamental purposes, the principal object to be kept in view is to throw the main vigour of circulation into the stem and terminal shoot. Consequently, with objects so similar as to be almost identical, the *modus operandi* need not differ materially.

Assuming that in the nursery rows or open border, young coniferous trees have been duly attended to during the first three years of their existence, so far as regards the rubbing out or "disbudding" of any misplaced shoots or leaders, very little will remain to be done in after years when such plants come to occupy a place in the plantation or pinetum.

Indeed, if more care were paid in early infancy to the regulation of habit and form in such subjects, there would be little need for after pruning. Occasionally a second leader will intrude, but upon its first discovery the use of the averuncator will restore the supremacy to its rightful owner; while an occasional side shoot of more than ordinary length, and probably interfering with his neighbours, may be satisfactorily reduced to a normal growth by a timely application of the system of fore-shortening or "branch pruning."

Our principal objection to the practice of stem pruning is the material risk incurred from the over-exudation of resinous matter from the tree. Indeed, it has been frequently observed in the case of the common Scots fir or larch, that if branches are amputated close to the trunk, the result is that the tree frequently bleeds to death. The exudation may go on slowly, and appear to be arrested from time to time according to the season of the year, weather, state of vegetation, &c.; but as spring comes round the gummy excretion returns, and after some years of dwining vitality, the tree succumbs to the mutilation it has received.

No adventitious application will suffice to allay the evil thus created. In minor cases of amputation of branches from the stem, the use of a pigment of Archangel tar and grease, or of Archangel and coal tar mixed in equal proportions, may prove efficacious, but it is far better to avoid the risk of requiring to apply these remedies by avoiding such systems of pruning, and selecting the more harmless method of *fore-shortening* or *branch pruning.*

Dividing the coniferous family under its three specific heads of Pinus, Abies, and Picea, it may be satisfactory now to observe how each of these species bear pruning.

I. *Pinus.*—As a rule this species will not thrive under the application of knife or chisel. It is highly desirable that young plants of this class should be carefully attended to before being planted out, and "disbudding" where necessary be freely resorted to, rather than that afterwards they should be subjected to the risk of mutilation by pruning, to which they are peculiarly averse. The regular *whorl*-like disposition of branches of this species renders it peculiarly unsuitable for "stem pruning," even if its constitution were suited to such a mode of treatment. The only mode of pruning admissible for this species (beyond disbudding) is the fore-shortening of the terminal shoot of any lateral branch whose over-growth may have destroyed the proportion or symmetry of the tree. Occasionally, in close grown plantations, where early management of the wood has been neglected, the lower branches of trees of the Pinus family will be found in a dying condition. In such cases it is better, if the tree is not meant to be sacrificed at once, to clear out the adjacent intruding trees, so as to admit of a free circulation of air and light, rather than to mutilate the conifer by lopping off at the stem the semi-dead branches, and thereby incurring severe exudation of sap from the wounds.

II. *Abies*.—This species bears with greater impunity than the previous one the free use of knife or chisel; their application, however, should be restricted to such cases as absolutely require their interference. Nothing can be more handsome or symmetrical than a well-grown specimen of any of the varieties of the fir tribe in all their varied forms of pyramidal shape. As in the case of the Pinus species already referred to, we should hesitate, unless in the matter of a double leader or contending lateral shoot, to apply either "fore-shortening" or "stem pruning" to any of this family. Their closely furnished habit and pendulous branching nature forbid it; but where necessary, most varieties of this division of the coniferous family will withstand "branch pruning" operations with impunity. Where it is requisite to restrict the growth of any member of this class, it is best done by cutting back the two years' terminal growth of all lateral shoots round the tree base, carrying the process as far up the tiers of branches as may be required, but equally on every side. In this respect the *A. Douglasii* is frequently much improved, and a vigour thereby thrown into its terminal leader, by which it is materially strengthened, while its symmetry and the straggling habits of the lower branches is much improved. We have frequently found that the cutting out of one year's growth of the terminal shoots of the lower branches of many of the *Abies* tribe materially improves their habit, and promotes their growth of leading shoot when young (say up to 20 feet in height).

III. *Picea*.—The usually symmetrical form of this species and its rigid outline of branches render it, in most situations, exempt from the perils and necessity of pruning. Many of the varieties in this class bear with reluctance the application of the knife. Where it is necessary to prune them, recourse should never be had to "stem pruning."

If so treated, the exudation of sap is so free that it has been observed to go on for years from the surface of the wound (if the branch has been a large one), ending in the gradual decay and destruction of the tree. *Disbudding* or *pinching* is the true mode of pruning this class, and it ought to be practised only during the earliest years of the plant. Grafted specimens of this species, such as *P. nobilis*, even when a foot long, will be improved by being cut back within an inch of the junction of the stock, whereby a better leader is obtained; but with larger specimens such a liberty cannot be taken, and the planter must content himself with the less severe process of "disbudding," or of simply *cutting out* two years' growth of the lateral terminals to within three or four tiers of the top of the tree. As progress is made, and the tree advances in height, this process may be continued year by year, always allowing several tiers of terminal shoots near the apex of the tree to remain untouched.

The period of the year at which coniferæ will bear with greatest impunity the process of pruning varies somewhat in the different species, and also with the soil and situation in which they are placed. As a rule, for *disbudding* or *rubbing out* any offending shoot in its embryo condition, the operation may be performed as soon as the irregularity is observed. For the mode of treatment by *branch pruning* or fore-shortening side laterals, if the weather be suitable, October, November, December, or January may be selected for the operation. We have occasionally found that, late in spring, coniferæ will bear pruning with safety; and if autumn has proved a dry season, so that the year's growth of wood is free from the danger of over-bleeding, the operation may be conducted with success towards the end of October. Plants of the Cedrus family will stand pruning as late in the season as the month of May; while the larch, which is rather inimical to the process at any time, will, if pruned so late in the season as April, bleed to the serious detriment of the tree.

In all pruning operations the principal object of the operator ought to be, whether his subjects are hardwood or coniferous, a steady effort to assist Nature in the healthy development of timber of good quality. By close *stem pruning* coniferous trees, wood of a knotty, coarse texture is induced, and weather ravages occasioned to the bole of timber; whereas, on the other hand, by judicious branch pruning regularly carried out as a system, the flow of sap and formation of timber are directed away from lateral branches, and increased vitality and growth are thrown into the main trunk of the tree.

Although thus advocating unmistakably the merits of *branch pruning* over *stem pruning* of coniferous trees, it must ever be borne in mind that a judicious system in early culture, by *dis-*

budding or *finger-and-thumb pinching*, is preferable to either of the systems of pruning we have had under review.

It would involve a considerably wider area of detail than this paper is intended to embrace were we to discuss individually the different members of the coniferous family in regard to their suitability for pruning of any description.

There are, however, some of them which are so unmistakably improved by the process, if judiciously performed, that it may be well to notice them in this report. We accordingly consider first the *C. Deodara*, regarding which in this country there is a great diversity of opinion. Planted as this cedar has been in most situations merely as a specimen tree, there have been frequent and well-grounded causes of complaint against it, in all varieties of soil and exposure. for its non-formation of leading shoot. It ought to be recollected that in its native habitats on the Himalayan slopes, this conifer naturally grows so close and in such dense masses as to self-prune its stem. Consequently, planted here in most instances from cuttings, it need not be wondered at that a heavy snow-fall in winter, such as occurred in 1860-61, or again in 1866, should have seriously interfered with the progress of its growth in most situations. There are, however, cases of cutting-grown specimens having proved themselves hardy, even under such vicissitudes of weather as we have referred to; but these were chiefly pruned or "branch-pinched" specimens. To compensate for the close, "drawn" habit which in its native country this conifer assumes, a judicious system of pruning is necessary; and we recommend that, in the case of small plants of from 2 to 3 feet in height, two or three tiers of the lateral young shoots around the leader should be pinched across with the averuncator. This process should be repeated annually for two or three years after it has once been adopted, care being taken that any shoots of undue length thrusting themselves out beneath the pruning point shall be lopped back as soon as observed. When the plant has attained under this treatment a height of 6 feet, the lowermost tier of branches may be safely cut off close to the stem. The tree will now be observed to make a decided upward growth of probably 1 foot in height, when the same system of side-shoot pruning around the terminal leader must be maintained, and in the following spring a second tier of lower branches may be removed. This treatment will be found highly efficacious for singly-grown specimens of the *C. Deodara* in this country; but if they could be planted in masses, at say 3 feet apart, and left *unpruned*, we have no doubt that Nature's own system of fostering the progress and development of the leading shoots would of itself be perfectly efficacious in producing, if not ornamental specimens, at least timber-bearing trees.

The only other member of the Cedrus genus which merits attention as susceptible of pruning within our experience is the *C. atlantica.* This cedar differs from the Deodar in producing a leading shoot with much greater freedom of habit in this country. It is, however, prone to throw out long side-spreading branches within a few feet of the ground, especially in rich soils with damp bottom. This tendency ought to be checked as apt to impair the vigour of sap-flow in the main stem. It is easily done by the sawing off within a few inches of the stem of the two lower tiers of branches, which is likewise very efficacious in inducing an increase of cellular-tissue development in the bole. It may be objected that in some instances the lower stem is thereby left naked and bare, but the habit of this tree is such that the branches left will in a very short time droop down and quite fill up the gaps caused by those which have been removed.

Regarding the pruning of the *Picea* species, great caution is necessary. Even experienced authorities like Mr M'Nab have only operated thoroughly on a few specimens, and in these cases their experience is not so decided as to warrant our adopting their conclusions as final. We should rather be inclined, in treating of this branch of the subject, to say that it is advisable, in as many cases as possible, that trees of this class should be planted, not as promiscuous plantation trees, but should be, when first planted, placed in the sites which they are destined to occupy singly in future generations. In regard to the pruning of younger plants of this group, we think that branch or pinch pruning may be very advantageously adopted. We recommend, however, in regard to this whole family, that the system of *disbudding* should be pursued in preference to any other mode of pruning. Many varieties of this species are greatly improved by "side pinching," as indeed the whole are by *disbudding.* Those chiefly improved in their earlier years by the former process are *P. Pinsapo, P. cephalonica,* and *P. Webbiana,*—the latter of which, while necessarily reared for their proper development in a shady site, are probably the most materially improved plants of their class, by free, if not severe, side pruning. *P. cephalonica* and *P. Pinsapo,* as well as that favourite conifer *P. Douglasii,* are all materially improved by early and careful attention to side pruning. In their case it is more absolutely salutary if practised in the nursery lines, but is beneficially extended to them even in their permanent sites.

In regard to the genus *Abies,* although the trees have a general tendency to produce side branches and develop lateral shoots, these are, as a rule, produced so regularly in lateral order that pruning is only advantageous in exceptional cases. Wherever a misplaced side branch occurs to destroy the symmetry and outline of the tree, fore-shortening of the offending shoot may be necessary; and where any tendency to develop a lateral leader presents itself, such a case must be dealt with summarily, and the offending rival removed.

Regarding the *Pinus* genus, we do not consider that any individual of this group will stand free pruning with impunity. Some varieties there are whose side-branching, ungainly shoots may be with advantage removed; but, upon the whole, it is better, in planting specimens of this class, to have them grouped in suitable situations rather than to place them where they may require to have their lower tiers of branches removed with positive disadvantage to the tree.

There are many other varieties of the newer coniferæ, regarding the suitability of which for pruning purposes we have not commented upon, and to which it seems unnecessary in this paper to refer, as they will likely, ere long, if they prove hardy, turn out to be quite adapted to general treatment in this country. We shall merely notice, in concluding this paper, such varieties as *Cupressus Lawsoniana, Juniperus chinensis, Taxodium sempervirens, Cupressus Lambertiana*, all of whose habits as specimen plants are materially improved by side pinching; and while we are yet ignorant of the many other varieties which, although well known to us in our plantations and gardens, are yet considered unsuited for improvement by pruning, there is no doubt that, as a rule, the judicious pruning of all coniferous trees is a subject of the deepest interest to arboriculture generally, and one yet quite unsolved in the many intricacies of its mystery.

ON THE STEM AND BRANCH PRUNING OF CONIFERS.

By John B. Webster, Forester, Churchhill, Verner's Bridge, Moy, Ireland.

[*Premium*—£3.]

Most coniferous trees contain a good deal of resin, some species, however, naturally contain a much greater quantity than others; yet the quantity which any of the species may contain is liable to be either augmented or diminished according to the quality of soil and the situation in which the trees are grown.

For example, trees grown on warm gravelly soil or rock contain more resin than trees upon clay; and again, trees upon clay contain more resin than trees upon peat bog.

Generally speaking, pine-trees grown upon gravel or rock feel the effects of stem pruning more keenly than trees of the same species grown upon clay or peat, as, from the quantity of resin which they contain, they are apt to bleed more profusely at the places where the branches have been cut off.

The merits of pruning coniferous trees, as far as appearances go, are merely a matter of taste, yet there are cases where pruning is absolutely necessary on the score of utility; and in order to illustrate this, the writer will give a few examples of the circumstances under which he has pruned some of the commoner kinds of conifer, before proceeding to give an account of any of the new species, which he has found capable of bearing that treatment.

No. 1 is a natural plantation of Scotch fir on the estate of Balmoral, Aberdeenshire. The soil consists of gravel, and in some places gravelly clay, with a thin coating of peat on the surface. The age of the trees in the plantation was from 30 to 45 years, and about a corresponding number of feet in height, and standing at an average distance of from 10 to 12 feet apart, or about 350 trees per acre.

In the interior of the forest, where the air was a little confined, the side branches had lost their vitality, and had decayed and fallen to the ground without the aid of artificial assistance, so that the trees presented a clean stem for a distance of about one-third of their height from the ground. When the timber was cut up for use, it was found to be free of knots, easily wrought, and of good quality.

The trees, however, along the margin of the plantation presented quite a different appearance; the branches for a distance of 10 to 15 feet up the stems were dead, but still attached to the trees, and from their exposure to the weather had got carbonised and hard as horns.

When the timber was cut up for use, it was found to be full of black knots, which on being seasoned got loose and fell out, thus leaving a hole in the deal.

In the summer of 1854 the writer had the hard knaggy branches pruned off close to the stems of the trees with a sharp chisel; the work was performed at different intervals, when hands could be spared from other work, as he has found, not only in this case, but in others of a similar nature, that fir branches after they have lost their vitality may be pruned at any season of the year with impunity. The results of this pruning were principally noticeable in two ways—*1st*, The plantation presented a clean, neat, tidy, healthy appearance; *2nd*, The annual concentric rings of new wood soon enveloped the places where the branches were cut off, and formed clean, sound, valuable timber, free of knots.

No. 2 is a series of plantations consisting of Scotch fir and larch on the same property as No. 1, the soil and geological features being similar. In the Highlands of Scotland young fir plantations are much damaged by the black-cock (*Tetrao tetrix*) and *grey hen*, eating out the terminal buds from the leaders and branches; likewise, in all cases where hares are plentiful, they often do immense damage by cutting over the leaders of the Scotch fir as well as the larch; this has the effect of inducing the trees to send up a plurality of leading stems, and if not corrected by early and judicious pruning, the trees form mere bushes, of little value except for shelter and game cover.

In April 1858 the writer pruned a considerable number of such trees—both larch and Scotch fir—the average height being about three feet. In performing the operation, the strongest and most central shoot was reserved for the future leader, the superfluous shoots being cut off close to the main stem with a sharp pruning-knife. By pruning the trees in April, the shoots left for leaders run little or no risk of being destroyed again that season; whereas, were they pruned at an earlier date, say, January or February, in all probability a good many of the shoots would be cut over or destroyed by black game, thus leaving the trees in a dilapidated state for that season.

This pruning had the effect of bringing the trees into a proper shape for producing useful timber, and as they suffered nothing in health, but continued to make rapid progress, the prospective value of the plantations was immensely increased.

No. 3 is a plantation of Scotch fir, on the estate of Churchill, Co. Armagh, Ireland. The soil consists of deep peat-bog.

In April 1861 the plantation was thinned for the first time, the trees being twelve years planted. One portion of the trees to be removed was cut out at once, and another portion stem pruned, by removing three tiers of the lower live branches with a sharp handbill, close to the stems of the trees.

The object in view with regard to stem pruning in this case was, that the situation was cold and bleak, being within a short distance of Lough Neagh to the north-west, and Anagariff Lake to the south-west, with a bare heather moor intervening both ways, and as it was desirable to have good cover on this part of the property—by stem pruning a portion of the trees the atmosphere was not too suddenly cooled down—so that the trees left for cover received no check in their growth, and yet, at the same time, had room to extend their side branches.

Another advantage gained was this,—had the trees to be removed been all cut out at once, probably one-half of them would have been rotten before they could have been disposed of, whereas, by allowing the stem pruned trees to remain in the plantation for a time, they were then available to be cut and sold, after the others had been disposed of, so that nothing was lost.

In 1865 the writer used a quantity of the stem pruned trees, mixed with others, from the same plantation, which had not been pruned (for posts), in the erection of a wire fence. In the course of felling the trees, it was noticed that the pruned trees were quite as tall as the unpruned, but not so thick at the butt-ends, and consequently less in cubic content; on the other hand, although the concentric layers of wood were not so thick, yet they were harder, better packed, and much firmer than on the others. In the course of four years after the erection of the fence, some of the posts made from the unpruned trees began to give way at the surface of the ground, and had to be replaced with others; whereas the posts made from the pruned trees lasted five years before it was found necessary to have them replaced.

No. 4 is a plantation which consists principally of larch and oak, and is situated on the same property as No. 3. The soil is a clay loam, resting upon clay, with the exception of several small patches of gravelly soil resting upon loose sand. The situation is rather exposed, being about two-thirds surrounded by water, and one-third by a deep peat-bog.

In September 1860 a portion of the larch was stem pruned, the trees being sixteen years planted, and their average height about 20 feet In performing the operation the live branches were cut off with a sharp handbill, close to the stems of the trees for a distance of about 6 feet from the ground. The trees seemed to suffer nothing in health from the effects of this stem pruning; those, however, growing upon gravelly soil bled a little at the places where the branches were cut off, but not to such an extent as to injure the constitution of the trees, and in the course of three years after the operation the wounds were completely healed up, so that the stems presented a clean, smooth, glossy surface; and at the present date—1872—they are in perfect health, and the timber hard, firmly packed, and of first-rate quality.

Having given a few examples of stem pruning some of the common conifers, the writer will now proceed to give a detailed statement of some of the new species which he has found capable of bearing that treatment.

Abies Douglasii, planted on clay loam, in a sheltered situation, in 1862. Height when planted, 7 feet. Stem pruned in April 1865, by cutting off the side branches close to the stem with a pruning-knife, 4 feet up. Present height of tree, 29 feet 4 inches; girth of stem three feet from the ground, 22 inches. In comparing the progress of this tree with another of the same species, which has not been pruned, the difference in their rate of growth has been considerable. Both trees were planted at the same time, and the same size, the only difference being that the latter is planted on deep peat-bog, The following is its present dimensions:—Height, 49 feet 7 inches; girth of stem three feet up, 32 inches; spread of branches, 39 feet in diameter.

Although the pruned tree has made less progress than its neighbours, it is nevertheless in good health; its foliage is a small shade yellower in colour, but this is commonly the case with all the species when growing under the same circumstances as regards soil. I have pruned several young trees of the same species, growing upon bog, in the month of April, and have never seen them suffer in health after the operation.

A. Morinda, growing on an exposed situation on clay loam, resting upon cold stiff clay. Stem pruned by removing three tiers of branches with a pruning-knife close to the stem in April 1867. This tree has been repeatedly damaged by spring frost, in consequence of which it has been induced to produce a plurality of leaders; these have been cut off in the month of April with a sharp knife close to the stem; it is, however, making but slow progress, but this is the case also with others of the same species which have not been pruned further than removing any superfluous shoots which assumed the proportions of rival leaders.

A. orientalis.—This is a very compact growing species, but of slow growth when newly planted. As an inducement to make it start growing in spring, I have found it an advantage to shorten the more prominent side branches by cutting off the tips in the month of April. Among a few young seedlings raised from home-grown seed, several plants produced a plurality of leaders; these were cut off with a sharp knife close to the stem in the month of April. This had the effect of bringing the plants into proper shape, and as they have not suffered in health, the results have been in every way satisfactory.

A. Mertensiana.—This tree appears to bear branch pruning with impunity. A specimen plant here having lost its leader by accident, a substitute was selected from one of the side branches, close by the place where the stem was broken over; the shattered wood was then pared off in a sloping direction at the place where decapitation took place, and the surrounding branches shortened by cutting off one-third of their length; this had the desired effect of strengthening the new leader. The tree never suffered in health, and is now perfect in form, and a model of beauty.

A. nigra.—This tree thrives remarkably on peat-bog, and in such situations bears branch pruning perfectly well. In correcting any superfluous shoots or rival leaders, I generally cut them off close to the stem in the month of April. Trees, however, that are growing on warm gravelly soil, as well as light sandy soil, when treated in this way, are apt to bleed at the places where the shoots have been cut off. Under such circumstances, the better plan is to shorten the shoot by cutting off about one-half of its length; this gives the principal leader the start, so that the ends in view are attained, although in a different way.

The above remarks are also applicable to *A. excelsa* and its varieties.

Araucaria imbricata lanceolata (the Moreton Bay Pine).—This species is rather tender, and young plants are liable to be injured by spring frosts. When this is the case, they often send up one or more young shoots from the base of the stem. Under such circumstances, I have found it the better plan to cut off the disfigured plant, as well as any superfluous shoots, in a sloping direction at the base, leaving the strongest shoot for the future tree. They bear stem and branch pruning under any circumstances as regards soil. I have always performed the operation in the month of April, and have found it in every way successful.

Larix Kæmpferi (Golden Larch).—This tree is but of slow growth, and on gravelly soil makes little or no progress. Our best specimen is growing on peat-bog, and even there it made but slow progress for several years after being planted. I tried branch pruning by cutting off the tips of the lower side branches in the month of April, and found that this had the effect of making it push more strongly. Its annual rate of growth since pruned is 6 inches, and before pruning was resorted to, from 2 to 3 inches.

Fitzroya patagonica.—This tree bears stem and branch pruning remarkably well. I have always performed the operation in the month of April, by cutting off the lower side branches close to the stem. It has a natural tendency to produce strong, irregular, rambling branches, nearly as thick as the main stem; these I have corrected by cutting off about one-third of their length, which had the effect of strengthening the stem, and inducing the branches to produce lateral shoots; and as its principal beauty consists in its fine weeping spray, some of which are upwards of a yard in length, and almost as fine as whipcord, a little timely and judicious pruning enhances its beauty very much.

Sequoia sempervirens, planted in a sheltered situation on deep peat-bog in 1862. Height when planted, 6 feet. Stem pruned by cutting off two tiers of its lower branches close to the stem in April 1864. In the summer of 1869 it produced a rival leading shoot at the top, which was cut off close to the stem in April 1870. The tree has always been in the best of health, and making rapid progress. Its present dimensions are as follows:—Height, 32 feet; girth of stem at the height of three feet from the surface, 32 inches.

Thuja gigantea, planted on boggy ground in 1863. Height when planted, 18 inches. Stem pruned by cutting off two tiers of the lower branches close to the stem in April 1867. Present dimensions, 13 feet high; girth of stem three feet from the surface, 16 inches. I have occasionally corrected rival leading shoots on other trees of the same species, as well as on *T. Lobbii*, by cutting them off in the month of April close to the stem, and have never seen them suffer in health after the operation.

Cedrus Deodara and *C. atlantica*, both of which trees are apt to produce rival leading shoots; these I have corrected by cutting off about one-half or one-third of their length, according to circumstances, in the month of April. In performing the operation, the portion removed was cut off close to a lateral shoot, which had the effect of checking its upward growth, as well as inducing the portion left to produce lateral twigs, which in the case of the *Deodara* constitutes its principal beauty. Both trees bear stem pruning. I have occasionally cut off one tier of their lower branches close to the stem in the month of April, and found the results as regards their capability of bearing this treatment in every way satisfactory.

Chamæcyparis glauca and *C. sphæroidea variegata.*—These trees thrive best with us on deep peat-bog, and are highly ornamental. In exposed situations they are easily damaged by the wind breaking and splitting off their branches. In such situations, in order to prevent, or at least lessen, the risk of such damage, I generally shorten any prominent side branches, as well as rival leaders, by cutting off about one-third or one-fourth of their length close by a lateral twig. When treated in this way they are capable of weathering a pretty severe storm with impunity. In boggy ground they bear almost any amount of pruning. I have always performed the operation in April.

Cryptomeria japonica.—This tree bears stem pruning remarkably well. I have occasionally removed two tiers of the lower side branches, as well as any superfluous leading shoots, by cutting them off close to the stem in the month of April, and have never seen the tree suffer in health, or deterred in growth after the operation.

Wellingtonia gigantea.—This tree bears pruning as well as the last-named species, and the above remarks may be applied to it. The following trees, belonging to the Cypress tribe, all bear stem pruning: *Cupressus Goveniana, C. Lambertiana,* and *C. Lawsoniana.* These were all pruned in April 1867, by removing one tier of their lower branches close to the stem. The trees never suffered in health, and are at the present date all making rapid progress.

Retinospora obtusa and *R. pisifera.*—I have occasionally corrected rival leaders on both of these trees, by cutting them off close to the stem. *R. obtusa* is apt to produce strong rambling side branches; these I have corrected by cutting off about one-fourth of their length close to a small branchlet. They bear pruning perfectly well. I have always performed the operation in April.

Thujopsis borealis.—In April 1871 I stem-pruned one of these trees by cutting off one tier of the lower branches close to the stem. I have also several times corrected rival leaders on other trees of the same species by cutting off about one-half of their length close by one of the small side branchlets. They seem to bear the operation well, and are at present in perfect health.

The following trees belonging to the silver fir tribe were all more or less injured by spring frost in 1867, in consequence of which they produced a plurality of leading shoots, which were cut off close to the stem in April 1868:—*Picea Pichta, P. bracteata, P. cilicia, P. cephalonica, P. Regina Amelia, P. pectinata,* and *P. Webbiana.* The whole of the trees made good strong growths during summer, and were decidedly improved by the operation.

In the summer of 1869 a young plant of *Picea lasiocarpa* lost its leader by the pine weevil (*Curculia pini*) eating off the bark from its leader. In the summer of 1870 the tree produced a quantity of small weakly leaders, which made little progress; the side branches, however, made strong rapid growths, and by the end of autumn the tree assumed the form of a mere bush. In April 1871 the superfluous leaders were carefully cut off with a sharp knife close to the stem, and the most prominent side branches pruned, by cutting off about 6 inches in length from the tips. The results of this pruning were highly successful. The tree has always been in excellent health, making good progress, and is now a model of beauty.

I have treated *P. Nordmanniana, P. Pinsapo,* and *P. firma* in the same manner under similar circumstances as the above, and with the same results. The four species referred to are interspersed in an old plantation where other trees were stubbed out, and where the *weevil* was rather plentiful. In a young plantation where a quantity of *P. nobilis* are planted here and there as forest trees, I frequently come across some of them with rival leaders; these are always cut off close to the stem in April, and I have never observed the trees deterred in growth or suffer in health from the operation.

The following trees belonging to the pine tribe have all been successfully stem-pruned by cutting off two tiers of their lower branches close to the stems in April:—*Pinus Laricio, P. Benthamiana, P. Pallasiana, P. ponderosa, P. austriaca, P. Pinaster,* and *P. Hamiltonii.*

The following list of pines having lost their leaders either by the attacks of the pine beetle (*Hylurgus piniperda*), or the pine weevil (*Curculia pini*), have all been successfully branch-pruned by cutting off one year's growth from the tips of the uppermost branches in April, at the same time leaving the strongest branch to be trained for the future leader:—*Pinus Lambertiana*, *P. pyrenaica*, *P. insignis*, *P. Jeffreyi*, *P. Cembra*, *P. excelsa*, *P. romana*, *P. parviflora*, *P. Edgariana*, *P. densiflora*, and *P. Bungeana*.

Sciadopitys verticillata (Umbrella Pine).—My experience in pruning this pine is rather limited, having only pruned one specimen in April 1871, by cutting off one year's growth from the tip of a rival leading branch; it, however, appears to bear the operation pretty well, but from the short time that has elapsed since it was performed, longer time will be required in order to test its capabilities for bearing this treatment.

Taxodium distichum (Deciduous Cypress).—This interesting tree, so unlike any of the other species of the conifer tribe, has a great resemblance to the yew; it, however, belongs to the natural order Coniferæ. I have pruned it successfully in April, by cutting off the lower branches close to the stem, as well as any rival leaders; likewise by cutting back or shortening any straggling branches at the top, in order to give the tree a proper balance.

Remarks.—The most of the trees referred to in this paper having been pruned in April, it is not, however, to be inferred from this that they may not be successfully pruned at any other period of the year, the writer having merely given his own experience and practice on this head. There is, however, this much to say in favour of April pruning, viz., that in a great many cases the wound, where a branch has been cut off or shortened, as the case may be, heals up the same season in which the operation has been performed, and the sooner that this is accomplished the better, as there is then less risk of the sap getting into a disorganised state or engendering disease.

ON FENCING AND SHELTER OF MOUNTAIN SHEEP WALKS.

By Patrick R. Latham, The Dinms, Falkirk.

[*Premium—The Minor Gold Medal.*]

Next in order and importance to draining mountain sheep walks come fencing and shelter. I believe more can be done in these respects, after a judicious system of draining has been effected, for the permanent improvement of mountain pastures, especially where such pastures are high-lying and exposed, than by the adoption of any other process. Many mountain ranges have been drained, but comparatively few have been benefited by fencing and shelter, and, in consequence, the amelioration which should have accrued from draining is not so great as it might otherwise have been. It is unnecessary to go into minute detail of all the advantages of fencing and shelter. To most practical men both principles in estate management are self-evident, and I believe the reason why so little has been done in carrying these important operations into effect is because farmers have not considered themselves justified, under the ordinary endurance of a lease, in executing these or any such permanent improvements as would necessitate large outlays of money; while, on the other hand, it may be inferred landed proprietors generally have not yet been convinced that an expenditure of capital in carrying out a system of fencing and planting for shelter on a large scale would be directly remunerative.

As regards fencing, every practical hill farmer is aware that so certain as gentle herding and tranquillity are necessary to the well-being and successful management of sheep stock, sure it is that the separation of neighbouring flocks, no matter whether the property of the same farmer or not, by the construction of suitable fences, is of the last importance. I have erected many miles of wire fencing in enclosing and subdividing mountain sheep walks, where the tendency of different hirsels, at certain seasons of the year, was to mix together, and where neighbouring flocks were in the habit of making *raids* upon adjoining pastures, and have always found the benefit of such fences to be immediate and satisfactory. When, however, I say *wire* fencing, I do not mean to signify that these are preferable to stone walls, when the materials for building dykes can be readily procured. It was on account of the expense and inconvenience of procuring materials that I adopted *wires*. In other circumstances, and where shelter is desirable, and could be secured by the construction of a march-dyke or subdivision wall, it would certainly be of great consequence, if the material were within easy reach, even although the expense at the outset should be somewhat excessive, that such excellent fences should be erected. As the cost of hill fencing must necessarily depend on situation, distance of carriage, and other circumstances, I need not say anything on that subject, nor more regarding the erection of the wire fences to which I have referred, than that I have always used larch standards and straining-posts, except at starting-points and corners, where iron straining-posts and stays were employed. The number of wires was usually five, that is, a No. 4 for the top line, and four 6's for the lower strands, the standards being placed 6 feet apart. I have also used as few as four wires in subdivisions, with the addition of the first casting of sheep-drains laid along the surface in lieu of the lowest wire, and this made a very serviceable fence. These fences were chiefly confined to high situations, however, beyond the reach of cattle.

But while I have said this much regarding the fencing of the higher ranges of a sheep farm, it is to the lower or wintering beats of the flock that the attention of both landlord and tenant should, in my opinion, be more especially directed. It is here that the bulk of the flock must live during inclement weather, and it is therefore the wintering land that should be protected from the destructive effects of flood and storm. Most observant farmers are well aware of the benefit which stock derive from shelter. They have discovered the fact in their own experience. And all intelligent farmers know the reason why stock decline so rapidly in condition from exposure is that the carbonaceous food, which would otherwise go to the support of their bodies, is consumed in keeping up their animal heat. To illustrate this I may quote Lord Ducie's experiment at Whitfield :—" One hundred sheep were placed in a shed, and ate 20 lbs. of swedes each per day. Another hundred were placed in the open air, and ate 25 lbs. each per day, yet, at the end of a certain period, the sheep which were protected, although they had a *fifth* less food, weighed 3 lbs. a head *more* than the unprotected sheep." Nothing can more clearly demonstrate the advantage of shelter than this, nor the loss that must annually arise to extensive flockmasters so long as their grazings remain in their present open and unprotected condition. Another proof of the decimating effect of exposure is to be found in the difference between the mortality on the inland and eastern parts of the country compared with that of the western seaboard, where, although the temperature of the climate is much higher and milder, heavy winds and rains are so frequent and protracted that the flocks become emaciated for want of protection, and die off in the spring of the year in great numbers. The difference between the mortality on the one side of the country compared with that of the west coast is not less than 5 per cent., and frequently much more.

Turning, then, to the improvement of the low-lying or wintering ranges of a sheep farm, it appears to me, as these lands are generally of easy access, that they must be well adapted in most situations for the growth of forest trees, and that a series of plantations could be so lined off as to add, not only to the picturesque appearance of pastoral estates, but also to the interests of the owner and flockmaster. Indeed, if the plantations were on a limited scale and skilfully laid off, not on the lower and more fertile meadows, but on the higher and harder lands, I venture to say higher rents would be procured for most farms, if not for all, than they now bring, and that the plantations themselves, besides being covers for game, would eventually pay. In fact, according to Mr James Brown (author of "The Forester," &c.), than whom we have no better authority, well-managed woods *do pay* a fair average rent over the period of years they take in growing to maturity. Moreover, while the amenity and beauty of an estate cannot be more successfully improved than by ornamental and judicious planting, viewing landed property as a marketable commodity, there is perhaps no other method by which its intrinsic value can be so certainly enhanced. Were plantations run up the marches of grazing farms, and clumps of various size and outline to be interspersed over the intermediate lands, an immense amount of shelter would be provided. Supposing the plantations were to stretch well up the face of the hills, a chain of wire fencing might be formed from one clump or enclosure to another, which would not only cut off the wintering from the summering lands, but be so directed as to join on to the fences of the intermediate plantations at such points as would leave a section of them projecting into the summering as well as into the wintering land. In this way shelter would not only be amply provided for both divisions, but the summering would be completely separated from the wintering, and the herbage of the latter would thereby be protected so long as the farmer thought proper to keep his stock on the higher division. This would have the good effect of preventing the stock from running to the low ground for shelter from temporary storms, and the wintering or reserved land would thus become not only a field for furnishing supplies of hay for the hardships of winter, but also an excellent nursery for gimmers at lambing-time, and the weaklings of the flock at all seasons.

So much depends on situation, quality of material, rate of wages, and otherwise, that I have not gone into the cost of constructing dykes, nor, for similar reasons, given any estimate or approximation to the expense of wire fences further than what is explained by foot-note. Nor is it expedient to say aught of the form of plantations, the variety of trees, or description of fence with which they should be enclosed, as all these must depend on the taste and views of the landlord, situation and soil, and due consideration of the object to be attained. Excellent and cheap fences, in certain localities, can be readily formed by a judicious combination of the sunk and wire fence, topped with a hedge of whins. For similar reasons I have not offered any hints on the planting of storm-stells or furze and broom in situations, as it is obvious all these useful adjuncts to the improvement of sheep walks may either be comprised in or superseded by the system which I have briefly propounded.

I have likewise deemed it unnecessary to give any formal estimate of the advantages that would arise to proprietor and tenant; but have no hesitation in asserting, from all I have learned and observed in a long experience, that were the proposed method of improving sheep farms judiciously effected, there would be such a diminution in mortality, and increase in bulk of clip and size of animal, as would enable the flockmaster to give a higher rent, probably as much more, for his grazing, as would go far to equal, if not entirely to cover, interest on the capital expended.

Note.—So much depends on the views and arrangements of parties as to erection, quality of wire, kind of strainers, standards and number of wires employed, length of carriage, market price of materials and labour, and nature of ground over which fences are to stretch, that no average rate of cost can be given. Indeed, the variable surface of the hills alone necessitates a difference of expense. Hence the cost of the fences which I have put up has varied considerably. On reference to accounts I find the outlay, exclusive of carriage, to have been from 6d. to 1s. per yard. There is so much done in wire fencing now-a-days, however, that it has become quite a trade. A number of houses of respectability are engaged in it, and as they vie with each other in expertness and cheapness of erection, parties cannot do better than take estimates from them.

ON THE TREATMENT AND MANAGEMENT OF OAK COPPICE IN SCOTLAND.

By Andrew Gilchrist, Forester, Urie, Stonehaven.

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A CONSIDERABLE extent of the woodlands of Scotland, particularly in the counties of Argyle, Dumbarton, Stirling, and Perth, being occupied with a crop of oak coppice, its treatment and management form a most important branch of the forestry of Scotland. Oak coppice is grown for ornament and shelter, as well as profit, on many estates, and we have only to glance at it as it decks the shores of many of our most beautiful Scottish lakes, or contemplate it as it clothes the rugged slopes of some romantic mountain or deep glen, to realise how peculiarly appropriate it is, and how well adapted to contribute to the wild grandeur and natural scenery of these Highland situations. Even in the vicinity of a mansion-house there are many portions of ground, as for example on the sides of a drive, or in a belt on the outskirts of the lawn, where it may be desirable to have an extensive view, and at the same time concealment from the outside, where oak coppice, interspersed with a few standard trees, forms the most suitable crop. When these places are divided into nearly equal portions and managed in a systematic manner, part being cut over every year or so according to the extent, they form a very useful and, in some situations, a most ornamental screen to those parts where tall-growing trees might be objectionable.

Whatever be the extent of coppice plantations on an estate, they should be apportioned and treated in succession. If there is sufficient acreage to allow a portion to be cut over every season successively, it is beyond all question the most judicious and profitable plan; this method enables the forester and proprietor to have an almost accurate estimate of the expense that is to be annually incurred in the rearing and cutting over of these, and keeps up an almost regular annual income from the plantations. If, for example, an enclosure of about 100 acres is divided into say four portions of about equal size (according to soil and other local peculiarities), and one of these cut over every five years, it keeps up the ornamental appearance of the district much better than if the whole plantation were cut over at one time. Another important advantage, especially in high-lying and exposed situations, is, that it tends to keep up the shelter that stock and crops derive from the proximity of plantations. The preservation of shelter should always form a primary consideration in determining the extent that is to be cut over in one season; through want of sufficient attention to this we have known both stock and crops to be deteriorated in value.

In very exposed situations, where shelter is really indispensable to the increased fertility and proper cultivation of the soil, as also to the health of the stock, it is almost impossible to over-estimate the bad effects that follow its sudden removal. When the productiveness of the soil has been increased by the influence of plantations, it is of paramount importance that it should be continued; when it is injudiciously and suddenly removed, the soil not only decreases in productiveness, but in some instances we have seen it incline to return to its pristine sterility. Wherever shelter is a primary object, it should be the aim of the forester, in apportioning and arranging the time of cutting over the plantation, to preserve as far as possible a certain amount of shelter to the district. This and the proportion of any plantation that is to be cut over in one season must be determined by a careful study of the peculiarities of the situation, nature of the soil, &c.

No absolute law can be laid down regarding the exact age at which oak coppice should be cut over; this can only be properly determined by the appearance of the crop, which to a considerable extent depends on the soil, situation, exposure, and method of rearing. It is from the appearance and condition of the bark that the most profitable time to cut must be determined. On damp soils the bark is frequently covered with mosses and lichens; it becomes rough in the exterior at a much earlier age. On such inhospitable soils we have seen instances where it would have been a decided advantage to the proprietor to have cut it over at fifteen years instead of leaving it for twenty; generally it should be cut over as soon as the annual growths begin to show signs of decreasing in vigour; it has certainly been left too long if the shoots have begun to dwindle to a dwarfish curled spray. When they are not cut over till this stunted state of growth has taken place the value of the bark will be considerably lessened, as there will be a deficiency of circulating sap. The liber or inner bark of these stunted trees is thin, and contains but little tannic acid; it takes a greater quantity to make a ton, and the limited supply of ascending sap makes its removal difficult and expensive. The rate of growth on poor soils and exposed situations is at best generally slow, and long exposure impairs the vital energies of the tree, gradually causing it to become stunted and hide-bound; consequently it is also most profitable to cut over these early. On suitable soils the bark is generally at its best after twenty years' growth; at this period, if the trees are in a healthy vigorous state of growth, the bark contains a greater proportion of tannic acid than at any other time. The bark of old trees of slow and impaired growth is generally thick in the cuticle (or cocky bark), consequently it is of less value to the tanner; but even old trees, that have but a thin exterior bark and a greater proportion of cellular matter, are often deficient in circulating sap; therefore there is but a small proportion of tannic acid 'found in the bark. Generally speaking, the best bark is obtained from trees that are in a very healthy growing condition, which not only have a large supply of ascending sap, but a greater thickness of *liber* to retain the sap as it ascends. It is during the ascent of the sap before the leaves have expanded that most tannic acid is present; after the leaves have fully expanded, the quality of the bark is not nearly so good; when the ascending sap reaches the fully-expanded leaves, exposure to the atmosphere causes it to be carbonised, and the cambium as it descends gives the inner layers of the bark a brown colour. Bark peeled after this takes place is comparatively deficient in astringent matter, and it takes a greater bulk of it to make a ton; and another disadvantage is, that the late cut stools send up much weaker shoots than those that are cut in the early part of the season.

After determining the most suitable time at which the coppice is to be cut, the first thing to be done is to go over the plantation and select a few of the best looking and most tree-like shoots, and mark them with paint, to be left at intervals over the whole of the ground; these should not exceed twenty to the acre, and even this number should be cut over with the next crop, and not be allowed to grow till they cover a large space of ground, as they through time overshadow the coppice shoots, and cause some of the stools to die out.

Where ornament is an important consideration, it is a common practice to leave a considerable number of old standards at equal distances over the ground; still, though this is desirable for the sake of appearance, it is often carried too far for the profitable growth of coppice. Large numbers of old branchy wide-spreading trees will prove hurtful, and through time exterminate the coppice stools. Wherever a number of standards must be interspersed with coppice, they should be brought up under a judicious system of foreshortening, and the strongest and most widespread of the side branches restrained and kept from overshadowing the coppice. Before commencing to cut over the shoots, the proper method is to send a person with a handbill, peeling iron, and mell, and instruct him in the first place to press down with his foot all the soil round the collar of the stool (or shoots), and then with the handbill cut through the bark to the wood, making a ring all round the base of the stem of each shoot, not more than 2 inches from the surface of the ground; a similar ring is cut about 30 inches higher up on the boles, and the bark between the cuts is removed for the purpose of preventing it from being rudely torn from the stool during the process of cutting over the shoots. It also serves as a guide to those who cut over the shoots, causing them to cut so as to have a low stool. When the axe is used for cutting, the stools should be sloped slightly up from two sides, so as to leave them with a sufficient convexity to prevent water from standing on their surface. It is absolutely necessary that the axemen who are employed should be ambidexters, and most expert and neat-handed men; when men of this class are employed, they very often take an interest in the work, and exert themselves to try how low and neat they can make the stools. With good clean-cutting axemen the axe is better than the saw for all shoots below six inches in diameter. On sloping ground the expert ambidexter, by standing on the high side, can cut over the shoot neatly with the slope of the ground, while those men who can only use the one hand always leave a rough surface on the stool, and the one side higher than the other. When the work is performed by these unpractised men, the stools are often too high above the surface of the ground, and the shoots that spring from these are never so strong as those that grow from low stools, where they are able to send out individual roots into the soil. When the cross-cut saw is to be used in cutting over strong shoots, in order to prevent the stool from being injured by the shoot falling, and tearing part of the outer wood, they should be laid in, and then neatly faced with the axe on that side on which the tree is intended to fall. As soon as the shoots are cut, the stools that have been sawn should be dressed with an adze, the outer edge being reduced to the level of the surface of the ground, so as to form a slight convexity to prevent water from standing on the stool. It is generally best to keep the most expert woodmen felling, and some less experienced, following with light axes, pruning off the branches from the bole; and these are followed by others with handbills, who prune out all the branches to about an inch in diameter. This part of the work is light, and should be done in a most active and expert manner. The operator, as he prunes out the branches, should cut them off in handy lengths of about 3 feet, and leave them collected in heaps ready to be carried by another set of men to the peelers. During the time of pruning the men should be instructed to preserve as many forked branches, similar to Y as possible; these should be from 3½ to 4 feet long, and are required for the erection of the drying ranges. The peelers are arranged on the sides of a plantation road or other suitable place where the work can be carried on without injuring the stools, and at the same time not at too great a distance from the cutters, and also convenient for the removal of the wood and bark. The whole of the wood should be carried to these suitable places for the peelers. The peelers are each provided with a peeling-iron and mell, and those who are to peel the smaller wood have a smooth stone about 10 inches square by 6 deep. A few of the best peelers are started to peel the boles and strongest pieces of wood; the bark on each bole is first cut into about 3 feet lengths with a handbill, and then taken off with a peeling-iron, great care being taken to keep the bark in as large pieces as possible. It greatly facilitates the work when each pair of these peelers is provided with one or two of what is technically called a *horse;* on these they lift one or both ends, and are thus the better enabled to take off the bark speedily and in large pieces. As soon as the bark is stripped, it should be laid in heaps with the fleshy side down, ready to be carried to the drying ranges. Those who peel the smaller wood generally sit on the ground with the wood to be peeled on their left side, and they start the bark by beating the piece of wood over the stone with the mell. When the bark is in good condition for peeling, a very moderate beating generally causes it to open from the wood, when it is easily taken off in one piece with the hand without the aid of the peeling-iron; but it sometimes happens that the iron is required, especially with the stronger branches. Severe beating with the mell should always be avoided, as it injures the bark and lessens its value to a considerable extent, causing it to contract mould, and making it more difficult to dry. When the bark is stripped off it is laid on two pieces of wood on the right hand side of the peeler, and thus as it is taken off it is built up neatly into a bundle, keeping the white side of each piece undermost. The various pieces of bark composing a bundle vary considerably in length; but they should be all stretched out to their full length, and any very short pieces laid in the middle, while attention is paid to keep one end of the bundle *neat* and *even*. The bark that composes the bundle is not *compressed* together, but all the pieces are laid in a careful manner, so that they can be readily lifted in a rope and carried to the ranges, and laid on these in a neat and even way, keeping the even ends of the bundles all on one side of the range. This neat and careful method of laying the bark in bundles as it is stripped off is easily done, and saves a great deal of sorting and gathering, as the bark is readily laid out on the ranges without the bundle being tossed and ravelled; indeed, it is an advantage to the handling of the bark all through the time of drying and working. The ranges should be erected on the most dry and airy situation that can be got in the wood. The best way is to drive in two rows of forked sticks into the ground, about 4 feet apart, opposite to each other, and about 30 inches between the rows, and leave them about 3 feet high above the ground, laying on other pieces of wood, and making the range in the form generally adopted. The ranges are sometimes put up with a considerable hang, so that the one side of the bark is higher than the other; this practice cannot be recommended, as it allows the water that falls on the high side to run inwards and pass down through among the bark to the lower side. A very little hang on the range is all that is necessary (at most not more than 2 inches), as when the bark is laid on to the range with the even ends of the bundles all to *one side*, it gives a considerable amount of slope to the bark sufficient to carry off the water, without risk of it being admitted at the high ends of the bark.

The erection of the ranges and laying out of the bark should be entrusted to a careful and experienced man. A person should either be kept regularly carrying the bark to the ranges, or each peeler caused to carry his own bark every two and a half hours: when this system of going to work is adopted, the superintendent should be present at the ranges when the bark is brought in, to see the *quantity* and *quality* that each peeler brings in, and at once check every appearance of carelessness.

When laying the bark on to the ranges, the outside should always be kept uppermost, and the bark laid not more than 18 inches deep, and the whole covered over with the largest and most flat pieces of bark, laid on in a way that will carry off the water from the range; in fact, the most particular attention should at all times be paid to prevent it from being even slightly saturated with water. "In the presence of moisture, tannic acid exposed to atmospheric agency absorbs oxygen, and is converted into gallic acid, a compound which is of no value to the tanner;" neither should the inner side be exposed to the influence of the sun, as it evaporates the juices that are most useful to the tanner. When the bark has been on the ranges for three or four days, it should be turned, or rather shifted, so as to keep it in an open state; this permits the air to circulate freely among it, and prevents it from becoming mouldy. Properly-cured bark breaks freely, and has a light cream colour, but when it has been damaged by exposure to the weather it is brown-coloured. This at once indicates that part of the astringent matter has been extracted by exposure to unfavourable influences during the drying process. It generally takes from two to three weeks to dry oak bark, but with favourable weather we have had it properly cured in eight days. As soon as it is considered to be sufficiently dried, it should be carted into a shed or built into an oblong stack, where it is chopped into pieces about 2 inches square, and put into bags ready for removal to the tanner. When it is built into a stack, it should be thatched, and a large tarpauling erected to keep off rain during the time it is being chopped and bagged.

Ranges are often very carelessly put up. We have seen instances where the one end of the range rested on the ground, and the other not more than 2 feet high. It is obvious that bark laid on in this careless way cannot dry so fast as it does when on properly-erected ranges; and besides, when the ranges are put up in this sloping fashion, the water naturally inclines to run down among the bark, thus causing a considerable waste of tannic acid. The bark being laid so near the surface of the ground, the drying winds do not circulate so freely through among it; consequently, in the best of seasons it takes longer to dry, and the quality is very often much inferior. Surely if it is worth while to strip the bark, it ought to be carefully and properly cured. Where there is annually a considerable quantity of oak bark to be dried, it would pay to keep portable sheds with shelves in them for drying the bark. With these, an improved quality of bark would doubtless be produced.

When the bark on the shoots is partially covered with a growth of mosses, it should be scraped off with an iron scraper previously to the bark being taken from the tree, as when this is not done it deteriorates the quality of the bark considerably.

During the progress of the work the superintendent should see that everything is going on with the greatest possible activity and regularity. The peelers should not be allowed to lag behind the cutters; on the contrary, let them be so close up to them that while they may not be out of wood, there may at the same time be but a small quantity of unpeeled wood left over night, as it gets much stiffer to peel the longer it lies after it is cut. The state of the weather affects the progress of the work. A genial shower after cold weather makes the stripping much easier, and gives a better quality of bark, while continued drought has the opposite effect. There is a great deal connected with the stripping and drying of bark that can only be learned from having participated in the work. When the hands have been hardened with the use of the various tools it becomes a much easier matter for a man to lead on others with expedition. The peeling is generally performed by women, and along with the drying costs 35s. to 50s. per ton, according to the size of the trees, rate of wages, and other circumstances.

As the cutting and peeling advances there should be a party following burning up the brushwood, so that the growth of the young shoots may not be obstructed in any way; it is very bad management to delay this and the collecting of the wood till after the peeling is finished. The young crop is sure to sustain permanent injury if these operations are delayed till the shoots have begun to grow.

Regarding the disposal of the peeled wood little can be said here, as it in a great measure depends on local demand. The first thing to be done is to select all the clean and suitable roots that are from 5 to 7 inches in diameter, and cross-cut off one or two lengths of clean spoke-wood. The remainder and small-sized wood is generally sold to chemical works, the price being from 10s. to 12s. per ton delivered. Where there is a demand in the vicinity, it is a good and profitable method to select any straight lengthy pieces that are suitable for pitwood, and sell them as such. This we have done in the county of Dumbarton, and sold these readily at 6s. per 100 feet lying in the wood.

The cleaning out and deepening of drains should also be attended to along with the clearing of the ground. In doing this, we have sometimes found that there had not been anything like a thorough system followed in the laying out of the drains, and consequently found it to be a decided advantage to change the line, and cut almost all new drains. Indeed, we have met with drains so very shallow and crooked as to be quite useless; five or six drains scarce 12 inches deep huddled into a flattish piece of ground not more than 20 yards broad, without having the least effect upon it, while one drain, 24 inches deep, taken straight up to the mouth of the suppressed spring rendered the whole extent thoroughly dry. It is impossible that a drain 12 inches deep can materially affect the roots of oak coppice; consequently, in cleaning out the existing drains, they should, if need be, be deepened to 24 inches, and cut to the following dimensions: 30 inches wide at top, and slope both sides down to 8 inches wide at bottom. The soil that is thrown out should be spread *well back* on both sides of the drain.

Another most important thing is the thorough repair of the fences that surround the plantations. They should be periodically examined and repaired; and the most sedulous attention should at all times be paid to prevent the inroads of cattle and sheep, as there is perhaps no other crop of wood that sustains more injury, both from the rub and bite of these animals, than oak coppice. Injury from these animals checks the rate of growth to such an extent that it often takes a number of years to retrieve the damage done in a few hours. A most conclusive proof of this came under our observation. A flock of sheep had been allowed to stray for a few hours into a part of a two-year-old oak coppice, and this portion, though growing on the best soil in the plantation, had a most cankered appearance, and did not thrive nearly so well for three years as the uninjured part did.

At this stage another most important operation is the filling up of any large vacancy that may be in the plantation. This is not necessary unless where the stools are more than 8 feet apart. These blanks are usually filled up with oak plants; but now that the price of oak bark has declined so much, we would strongly recommend the planting of larch instead. If the soil is dry and suitable for the larch, it is by far the most profitable tree to plant in these blanks. It is well known that larches thrive vigorously among oaks, and this being the case, they will, even after only twenty years' growth, be found to be a more valuable crop than planted oak. Their bark is eâsier stripped, and when taken from young trees it brings nearly as much per ton as the bark of second quality does; the larch being of an upright habit of growth, and its branches open and airy. Oaks are generally found to thrive much better beside them than they will do beside any other trees.

The best system of planting the larches is the L notch. Two years' seedlings, one year transplanted, are the best for exposed situations; but two years' seedlings, two years transplanted, if well rooted, may be used on better soils and situations. The planting may be done in the autumn or spring. When the blanks are to be filled up with oaks, pits should be dug, 18 inches square and 12 inches deep, in the month of August, and the plants put in in spring. Winter's exposure to the action of the weather thoroughly pulverises the soil, and brings it into fine condition for the roots. In districts where coppice-wood is grown it is quite common to see strong oak plants notched into the ground instead of planting them in pits. We have seen instances where the notching was but imperfectly performed, fine oak plants stuck into the ground, and their roots not covered to within two inches of their former depth, and scarcely a plant standing erect. We could give several examples of the superiority of pit-planted trees as compared with notching. For example, in 1863 we had to make up the blanks in an oak coppice plantation that had been planted with oaks in 1861. They had all been planted by notching, and there was not more than one-fourth of them that had grown, and even these had but a very stunted appearance. Those planted in 1863 were put into pits that had been opened five months previous, and there was scarcely a plant failed, and during the first season the average growth was greater than those that had grown for three years; and for several years afterwards the pit-planted trees were readily distinguished by their more exuberant foliage and vigorous growth. When oak plants are notched, their roots are liable to be squeezed or doubled up, and their tender extremities are left pressing hard on the undisturbed soil, consequently they are at the first hindered from extending; whereas properly pit-planted trees have a layer of soft soil all round between the roots and sides of the pits, which encourages the extension and formation of the rootlets, and enables the plant to make a considerable growth during the first season, instead of leaving it to pine away in a sickly condition.

In damp soils that are not suitable for the growth of larch, birch and black Italian poplars may be planted. We have sometimes seen these damp places planted with spruce; but these become so dense and spreading that they tend through time to exterminate the coppice stools near them.

After the young crop of oak coppice has grown for two seasons, the shoots should be thinned, leaving from six to eight on each stool, according to its size. At the first and at all subsequent thinnings attention should be paid to leave those shoots, as the permanent crop, that spring out nearest the surface of the ground, as these are the most rapid growers, and by sending out, as they always do, a number of fresh individual roots, they become more tree-like in their form of growth; and this additional extension of roots increases the size and vigour of the stools, and makes it a much easier matter to keep the stools in a low and proper form. Those shoots that spring out from the higher parts of the stool are not so vigorous and tree-like in their growth, and besides they encourage the stools to become higher, and, as it were, causes it to grow away from the soil. The second thinning may be done about six years after this, and the number of shoots reduced to about two or three on each stool, according to the size of stool, distance apart, &c. At this time any stools of hazel are cut clean over, and along with the oak thinnings are pruned out to the point, and tied up into bundles of 100 each, and sold for the manufacture of crates and hampers. These thinnings we have sold at 13s. 6d. per 1000 for rods not less than 6 feet long, while the smaller and shorter sizes (or wands), from 6 to 4 feet long, brought about 7s. on the ground. All the prunings of birch are also put into bundles, 22 inches in girth, for besoms, which bring about 1s. 2d. per dozen.

The next period of thinning may be two years before cutting over the crop. At this time all the slender, ill-thriven, and overhung shoots should be cut out and sold for crate-wood. While recommending this we are aware that it is not very generally adopted; in fact, many object to it; but it can be easily shown that it is by far the most profitable system of management. The removal of the overhung and most ill-thriven shoots is practically found to *increase* the *quantity* and *quality* of the bark. Confinement having reduced the vital energy of these shoots, they have but a very thin coating of liber, and are far deficient in ascending sap; consequently the bark contains but a very small proportion of tannic acid, and it is difficult and expensive to peel; so much is this the case, that we have frequently found that it actually did not pay the expense of stripping. When these are cut out during the winter months and sold as strong crate-wood, they bring upwards of 12s. per ton in the plantation, which far more than doubly pays for the expense of cutting. And the cutting out of these at this time exposes those that are left to the influences of the atmosphere, and increases their energies. This increases the quantity of ascending sap, and causes the formation of cambium cells, and adds to the thickness of the liber. In a word, thinning at this time encourages the development of all those elements that are absolutely essential to the production of the greatest quantity of bark. The vigorous state of growth promoted by the admission of light and air gives a greater proportion of tannic acid, and makes the peeling much easier. Now that the price of bark continues to fall, this system of management should be more extensively adopted, as it unquestionably lessens the cost of peeling, and improves the quality of the bark to a high degree.

In some oak coppices there are frequently a few stools of ash, elm, alder, birch, &c.; these are generally cut over and disposed of before commencing to the oaks. In the county of Dumbarton these meet with a ready sale at from 8s. to 12s. per ton lying in the wood.

When cutting out the thinnings great attention should be paid to see that they are all cut close off by the stool. as some careless workmen leave a short spur, which encourages the undue increase of the stool.

It is a common practice to delay the first thinning of oak coppice till it has grown for five years; but this, beyond all question, materially retards the rate of growth, and produces a slender shoot, and it is very often found that it is those shoots that spring from the higher parts of the stool that are the strongest, and that they have to a certain extent overhung and weakened those that were the most eligible for being left as the permanent crop. This method of thinning is generally performed at intervals of five years, and accompanied each time by a system of severe close pruning, in some instances the stem being left, with not more than two or three lateral branches. This method of pruning reduces the rate of growth, and the large number of wounds made in the stem by the removal of these branches encourages the growth of spray, and produces a rough exterior which deteriorates the quality of bark. The nutritive energies of the trees are so much impaired by the loss of so many of the leaves, that the proper healing over of these wounds is the work of a number of years. The evil effects are much aggravated when the pruning is performed, as it very often is, by careless and unpractised men during the winter months. We have frequently observed that these men make unnecessary wounds, and then the exposure to the weather, when the vital functions are dormant, dries up the inner bark, and makes the wounds larger and more difficult to heal. Consequently the trees often become so cankered and bark-bound that they make little progress in their growth, and when cut over produce a much inferior quantity and quality of bark. There are still not a few foresters who cling tenaciously to this system of rearing oak coppice, but for what reason we do not know, except that it has been handed down to them by their forefathers, and always practised in the district, and they have never troubled themselves to learn that it was not in harmony with the laws of vegetable life. Any one acquainted with the organism of trees must know that severe close pruning is opposed to the healthy and rapid growth of the tree. An intimate acquaintance with the general laws of nature, to which trees in their growth and development are subject, combined with experience and observation, indubitably proves that severe close pruning tends to waste rather than utilise the nutritive energies of the tree. It reduces the thickness of the liber, diminishes the quantity of ascending sap, and, in short, it actually militates against the production of all those elements that are essential to produce a good quality of bark and a remunerative crop of oak coppice.

The best method of pruning is foreshortening, and it ought to be begun after two years' growth. When the first thinning is being performed an experienced pruner should follow the thinners, and with a pocket-knife prune the shoots. At this time the pruning is nothing more than simply shortening any rival leader that may exist on one shoot. This system of pruning should be repeated in two or three years in the very same manner, merely checking contending tops and over-strong side branches. And when one shoot has two or more tops, select the one as leader that will have a natural tendency to grow in an upright direction without infringing upon or overhanging those that spring from the some stool. Except in the case of any low strong side branch, that seems to be diverting too much of the nutritive food from the growth of the stem, no pruning close by the bole should be allowed, as it is not only quite unnecessary, but tends to retard the rate of growth. Pruning is only necessary and allowable to check and prevent a *waste* of *energy*, as in the case of contending tops and strong side branches that seem to be absorbing too much of the nutritive food from the main shoot. The great desideratum in pruning is to keep a great proportion of the shoots clothed with healthy *branches as feeders of the stem*, and at the same time keep these in such subordination as will prevent them from increasing their own growth to undue limits. When the coppice shoots are pruned in this manner their branches are short and well furnished with branchlets and leaves, which absorb the nourishment that is to be derived from solar light, and elaborate the sap that is imbibed by the roots. Brought up under these conditions the shoot appropriates the greatest proportion of the nutritive food for its own increase; and this, combined with the influence of the surrounding trees, causes the lower side branches to gradually decrease in vigour as the shoots increase in height. Consequently they never receive any check from the pruning, but are all along kept in a most healthy and rapid growing state. In the majority of cases twice pruning is all that is necessary, except at the time of thinning, clearing off any decayed branches that may be on the lower part of the stem. This method of pruning is not only in harmony with the laws of nature, and therefore founded on sound principles, but it propagates and conserves all those constituents that are indispensable to the production of the best quality of bark and greatest quantity of wood.

In regard to the soils most suitable for the growth of oak coppice little can be said, as it grows on soils of very diverse qualities. It thrives moderately well on very poor soils, if naturally dry or well drained. The most suitable soil is a good loam mixed with sand, and on a subsoil of clay and gravel; it also thrives well on a light sandy soil, with a gravelly subsoil when sufficiently drained. We have also seen a very good crop of coppice cut from a black mossy soil resting on subsoil of clay. Perhaps the most unsuitable soil is marsh that cannot be properly drained. It would be much more profitable to cease to cultivate the oak in those inhospitable soils, and plant them with alder or black

Italian poplar It is a mistake to attempt to grow alder and oak together in these damp places, as the alder grows much faster and cleaner by itself. The great and most important thing in regard to soils is *proper drainage*. The granulated particles of undrained damp soils being quite glued together from the effect of stagnant water, there is but a limited circulation of air, and the admission of rain water is obstructed by the same cause. Rain water is one of our best natural fertilisers, and when allowed to freely percolate into a properly drained or naturally dry soil, it assists regularly and steadily to decompose the mineral and organic ingredients of the soil, and thus these are turned into food fit to be imbibed by the roots. Drainage raises the temperature of the soil and provides a greater range of feeding surface for the roots of the trees. It also encourages the production of spongioles, and enables the roots to extend their ramifications, both in a perpendicular and lateral direction. Stagnant water is destitute of those ingredients that tend to promote the sound and vigorous growth of trees, such as carbonic acid and the alkaline substances. It is also considerably impregnated with vegetable putridity, which is inimical to the healthy growth of trees. On cold damp soils the young wood is very imperfectly ripened in autumn, and the first sharp frost generally destroys a great many of the leading tops and young growths at the extremities of the branches. On marshy situations, with a humid atmosphere, want of efficient drainage keeps the roots in a state of semi-activity during the whole winter, and for want of sufficient repose they grow very feebly. On black mossy soils, with a clay subsoil, we have found it necessary to lay out the drains 24 feet apart, and cut them to 30 inches deep, while on soils with a non-retentive bottom 34 feet apart and 24 inches deep has been sufficient.

The only method of replenishing old and overgrown stools, that through careless felling have become so high above the surface of the ground that none of the shoots that spring from them are able to send out any fresh roots into the soil, is to strip the bark neatly off to the very surface of the ground, and cut over the old stock, leaving it with a smooth and slightly convex surface. In doing this, we have sometimes found it necessary to clear away a portion of the soil from the collar of the stool with a spade, and in some instances we have reduced the highest of the strong surface roots with the axe, and this induced young growths to spring freely from these. We have frequently seen shoots more than 12 inches high spring from these the first season.

Thorough drainage of damp soils materially assists to invigorate and replenish old stools, the temperature of the soil being raised by the removal of the suppressed water, new rootlets are formed, and the growth of the shoots becomes more vigorous and healthy. Timely foreshortening materially assists to bring feeble shoots into a more rapid state of growth.

When oaks are planted for the purpose of forming coppice wood, they are generally put in at eight feet apart, and the intermediate spaces filled up to three feet apart with larches. Both are planted in the manner we have indicated for the filling up of blanks in the old plantations. In rearing these trees the larch nurses should be progressively removed during the first fifteen years' growth, and the oaks encouraged to grow up in a *stout* branchy habit; so that when cut over, at twenty years' growth, the stools may be from six to eight inches in diameter; some persons cut over the oaks when they are not more than two or three inches in diameter, but the shoots produced from these small stools are never strong.

As the value of the crop depends to such an extent on local peculiarities, we purposely abstain from giving any detailed quotation of the returns per acre of oak coppice. We have found that the thinnings from a properly managed oak coppice brought as much as paid all the expenses of thinning and pruning. We would strongly recommend proprietors to cease to grow oak coppice so extensively as has been hitherto done, as, owing to the decrease in the price of oak bark and the increased rate of wages, it is not nearly so profitable a crop as formerly. There are many soils occupied with oak coppice that would grow a good sound crop of larch, which would pay four times more than oak. We have cut a good crop of larches forty-two years planted, and known it to bring L.120 per acre; while a twenty years' old crop of oak coppice growing contiguous to it and on a similar soil, after paying expenses of cutting, &c., only brought L.12, 10s., making forty years' growth of oak worth only L.25 per acre, leaving L.95 of a balance in favour of a crop of larch.

ON THE RECLAMATION AND PROTECTION OF AGRICULTURAL LAND.

By David Stevenson, Vice-President of the Royal Society of Edinburgh, Member of the Institution of Civil Engineers, and Consulting Engineer to the Highland and Agricultural Society.

It is needless to inquire at what date and in what country attention was first directed to the reclamation and protection of land, as such an inquiry would not afford any satisfactory or useful result. But it is well known that the subject has long engaged the attention of engineers, and is viewed as of great practical importance by agriculturists. It has occurred to me, therefore, that an exposition of the state of our knowledge regarding this branch of agricultural engineering, founded on personal experience and study of the principal rivers and estuaries of the United Kingdom, may prove not uninteresting to the members of the Highland Society.

In offering this exposition of an extensive subject, it may be as well in the outset to explain, that I do not propose to describe those gigantic land-making and land-improving works carried out in early times in some foreign countries, and to which the present kingdom of Holland, for example, may be said in a great measure, if not altogether to owe its existence, and the fertile banks of the Po their productiveness. A wide enough field of observation may be found within our own country, where, in prosecuting the ordinary pursuits of agriculture, thousands of acres of barren sands and flooded marshes have been converted into valuable land, and many rivers have been confined within reasonable bounds by engineering works of greater or less magnitude. Neither do I propose to discuss questions of hydraulics, which belong to pure engineering, or to state details of construction that have already been given in many interesting papers in the Society's Transactions, describing individual reclamation improvements. My object is rather to show, generally, in what way engineering is connected with agriculture in the important work of reclaiming and protecting land—what are the varied conditions of exposure and locality which render such protection necessary,—and what description of work is best adapted to each particular case, for the information not so much of engineers, as of agriculturists, to whom this communication is specially addressed.

The general feature of all low-lying lands intersected by rivers, of all marsh lands on the borders of tidal estuaries, and of some extensive tracts of land along the sea-coast, is their liability to injury, and their need of protection by artificial works, and the elements with which the engineer has to contend in effecting agricultural improvements in such situations are, *river-currents and floods*, *tidal-currents* and *sea-waves*. The subject, therefore, with which we have to deal embraces distinct compartments, each of which has its own characteristic features and treatment, and it may perhaps be most conveniently considered under the following general sections:—

I. The protection of land from the wasting action of rivers.

II. The prevention of rivers, when in flood, overflowing low-lying tracts of land.

III. The reclamation and protection of tidal lands situated on estuaries; and

IV. The defence of sea-shores from the action of the waves.

ge tracts of peat bog, such as Blair Drummond moss in Perthshire, and of waste land, such as the Fylde of Lancashire, as well as land submerged by lochs, as Loch Leven in Kinross-shire, have been reclaimed and brought into cultivation; but these improvements having been effected by drainage, do not, it will be seen, come within the range of the topics treated of in this paper.

SECTION I.

In considering the first of the topics to be discussed, which refers to the wasting action of rivers on their banks, the following general statements may be made:—

1. The scouring or abrading action of a stream is influenced by its velocity.
2. The velocity again is influenced by the fall or slope on its surface.*
3. The effect of the scouring action on the adjoining banks is further influenced by their geological formation,—experiments having shown that ordinary sandy soil is moved by a current having a velocity of about half a mile an hour, and that a current of about one mile per hour will move fine gravel, while heavy gravel resists a current of upwards of two miles per hour.

An illustration of the abrading action of small rivers or streams may be found whenever they traverse a flat alluvial tract of country. If the velocity of the stream be sufficiently great to abrade the banks, it will commence an attack at some vulnerable point where the soil is very soft. This soft bank soon assumes a concave outline, round which the stream sweeps and impinges with violence directly on the opposite bank, which, in its turn, soon yields to the abrading action, and another concavity is hollowed out in a direction opposite to that first formed. In this way the river, deflected from bank to bank, enlarges its bends and lengthens its course. But as the length of its course increases, the gradient and velocity of the stream are reduced, and its abrading power, which, as we have said, depends on the velocity, may ultimately by successive bends be so diminished that the original destructive current becomes a placid stream, incapable of making further violent inroads on the banks; and to this state of permanent conservation many of the tortuous, sluggish rivers to be seen meandering through the flat meadow lands of England have been brought, but the sluggishness of such streams may have been attained at a considerable sacrifice of valuable land. Perhaps the most notable instance, on a large scale, in Scotland, of a winding river is the Forth. The straight distance from Stirling to Alloa is about 5 miles, which with a fall of 13 feet between the two places gives a gradient of 2 feet 7 inches per mile, but following the course of the river the distance is about 10 miles, giving a gradient of about 1 foot 3 inches per mile, while the land occupied by the "Links" or "bends" amounts to nearly 500 acres unavailable for cultivation. In referring to this case, I do not wish in any way to countenance the idea, that either in the interests of agriculculture or navigation it would be profitable or desirable to form a straight cut from Stirling to Alloa. I only refer to it as being perhaps the most remarkable instance, in our country, of a winding river which has attained a permanent course, and its bed and banks a state of stability.

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* When a river is in train also by its hydraulic mean depth.

There are, however, many winding rivers where a "cut" may be made with great advantage, as at the river Kinnel, in Dumfriesshire, which is shown in fig. 1. That "cut," which was formed under the direction of Messrs D. & T. Stevenson, was made chiefly for the better regulation of the boundaries of the march lines of the adjacent properties. It will be seen that the river was, in that instance, carried through a narrow neck of land measuring about 500 feet, and having a *detour* of upwards of 4500 feet. Fig 2. is a cross section of the new channel. To the effect of such

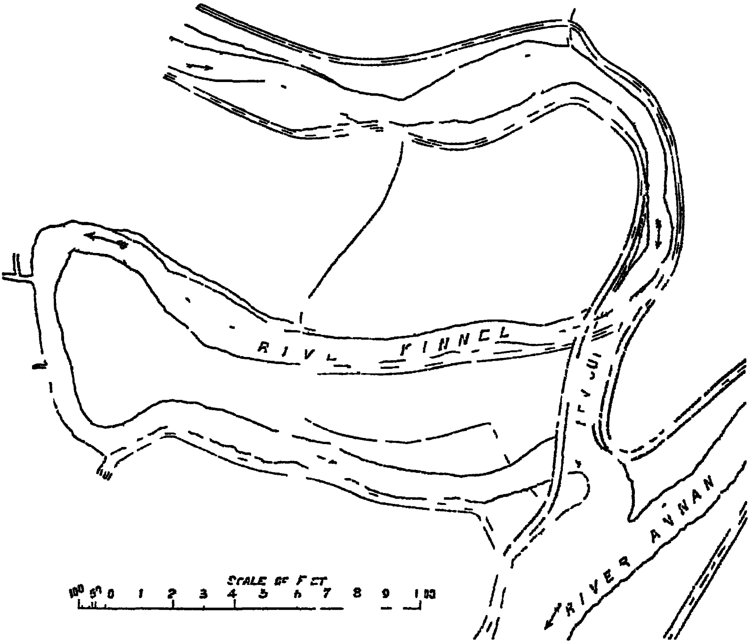


Fig 1.

alterations on a river's banks and floods I shall have occasion to refer hereafter, and merely add here that the cut at the Kinnel was formed twenty years ago, and Sir William Jardine, through whose property it was made, informs me that it "has proved most satisfactory in every respect, and that the banks have stood without any necessity for repair."

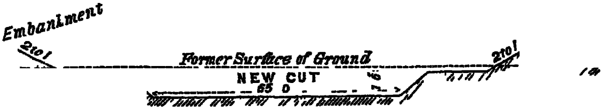


Fig 2.

The violence of scouring action is also well illustrated on rivers with steep gradients and high velocities flowing through a channel having alternately high gravel scars and flat gravel banks. Such, for example, as the Ae in Dumfriesshire, which at some places has a fall of 45 feet per mile. In all such cases, the river highly charged with gravel has its power of erosion greatly augmented, and very speedily hollows out its solid banks, and makes serious inroads on the adjoining property, and, if unchecked, will continue to abrade the banks to an extent that may interfere with existing roads and fences, and thus prove highly prejudicial. In my own experience I have found both fences and roads carried away, to the great inconvenience of the public and damage to property.

The remedial measures for checking the abrading action referred to are, the planting of willows or reeds on the banks, the deposit of broken stones of sizes varying with the exposure, timber piling and planking, and the deposit of fascines or faggots of brushwood. It may, however, be safely affirmed that nothing tends more to the protection of a river's banks than a uniformly smooth surface. The water in such a case meeting no obstruction, glides gently past without resistance. But if the banks have from neglect got into a rugged, uneven state, they are comparatively easily excavated by the current; and it may be well to keep in view that an inoffensive, sluggish stream, which passes quietly along a smooth bank, will become a formidable *excavator* if there be opposed to its otherwise gentle flow a succession of rugged protuberances. Each of such protuberances, though on a small scale, acts in the same way as a jetty, the water is heaped up on its upstream side, and flows with increased velocity and scouring power round its extremity, and the river thus becomes more destructive in wasting and widening its banks.

In all cases, therefore, where such streams intersect valuable property, all irregularities and incipient wastings in the banks should be repaired without loss of time after the occurrence of each flood.

In many cases, however, such repairs cannot be conveniently made until the wasting has proceeded so far as to render necessary some of the works to which I have referred,—such as the deposit of stone, broken like large road metal, in sufficient quantity to make a new face to the river's bank, which is a simple and often efficient means of defence, and should in all cases be first tried. But where the current is strong enough to sweep away road metal, or even large material, and especially where it has formed an acute bend in the bank, and hollowed out a deep pool in the bed of the river, works of a more expensive character may be required such as I have shown on the accompanying cut, fig. 3, which has, with modifications to suit the localities, been executed with good effect. It consists, as will be seen, of round piles and cross planking with back piles and cross ties backed with faggots and clay. Upon the top of this rest layers of faggots, the whole being surmounted by a turfed embankment, and protected at the bottom by rubble stones. Figs. 4 and 5 are sections of other forms of protection adapted to situations where the depth of water is not so great, and with some modification in the arrangement and sizes of the materials to suit special circumstances. I have found that the styles of construction shown in these three sections were useful in many cases where protection was necessary.

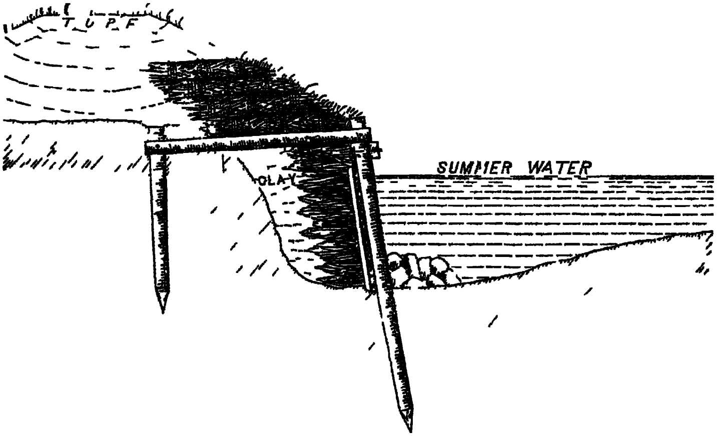


Fig. 3.

I may only repeat, on this branch of the subject, that early careful attention may often avert the necessity of subsequent expensive works, and that the timely planting of a *few willow saplings* may avoid the driving of many *piles of full-grown timber*.

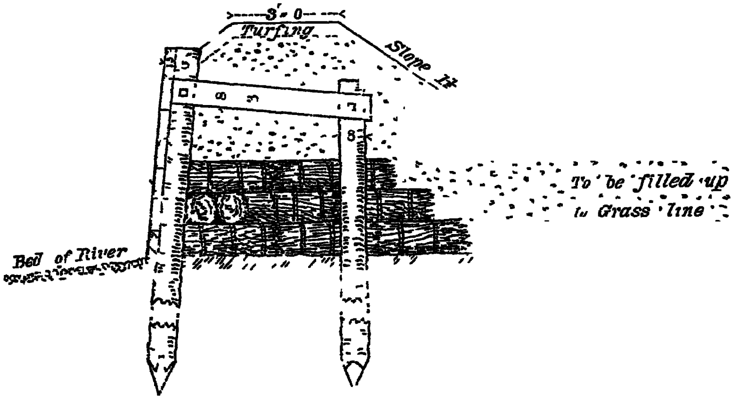
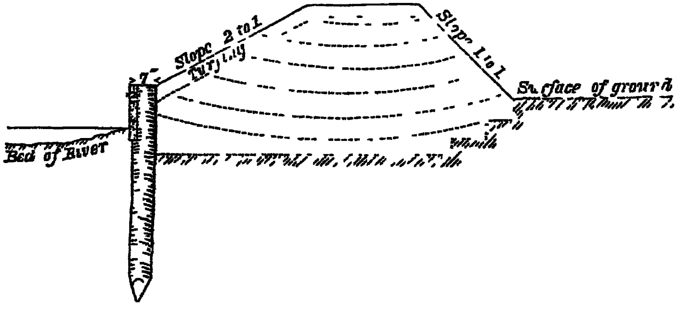


Fig. 4.

The junction of two rivers is often the occasion of much injury, by causing extensive diversions of the channel, particularly if the axes of the two streams form a large angle at the point of junction, as will be seen from fig. 6, in which the arrows represent the junction of the Ae and Kirkburn, and the same objectionable feature will be seen in the junction of the Kinnel and the Annan, to which I have already referred at page 135. In such cases, according as either river happens to be in higher flood, the stream below the junction is forced to one or other side, and when the valley through which it flows is broad, and the banks are composed of soft material, the river may be found shifting its channel from side to side of the valley, and devastating all the intervening land. This



may sometimes be obviated by diverting the courses of the rivers immediately above their junction, in such a direction and to such an extent that at the point where they unite the direction of their respective currents should be as nearly as possible parallel. But the configuration of the ground and the boundaries of the adjacent properties may present such difficulties and involve such cost as to render such a work practically impossible, and, in that case, the river must be left to take its course, and the land within reach of its flood lines abandoned for all agricultural puposes.

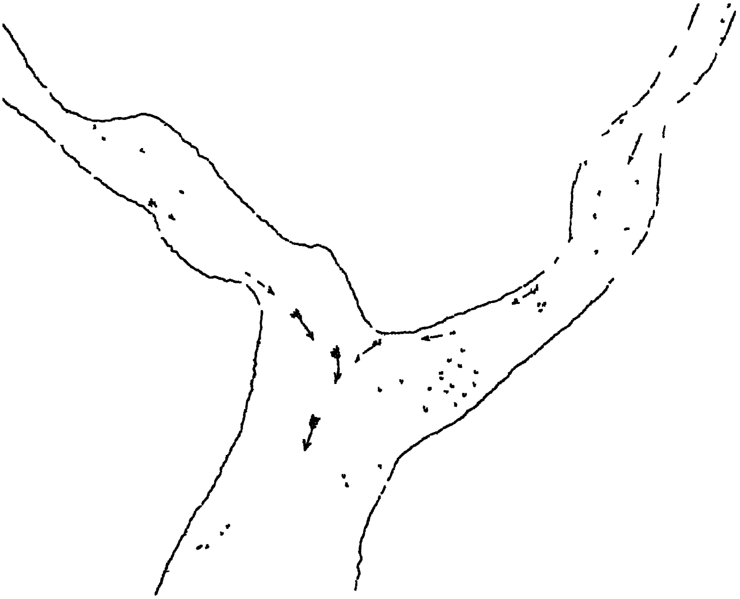


Fig 6.

Section II.

The second branch of the subject relates to the protection of low-lying lands against the effects of river floods.

With reference to such inundations, I may here repeat what I have elsewhere stated,* that the quantity of flood water passed by rivers bears no constant ratio either to their summer water discharge or to their drainage area. This conclusion is the natural consequence of the very different geographical and agricultural characteristics of the districts through which rivers flow.

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* The Principles and Piactice of Canal and River Engineering. A. & C. Black, Edinr., 1872.

The drainage area in one situation, for example, may include large tracts of hill country, having steep and scantily soiled slopes, from which the rain is readily discharged. In other places the surface may be flat, or gently rising deeply soiled land, absorbing much of the rain that falls, and giving it off only by slow degrees. The discharge of other districts, again, may be much influenced by their geological formation and the absorbing power of the underlying strata.

Agricultural improvements, also, exert an important influence on the drainage of land, large tracts of sheep grazing pasture, for example, being less absorbent than an equal area of well-drained arable land. Again, all rivers which flow from lakes may be said to have natural reservoirs at their source for the storage of surplus water, which tends to check the floods in the low country. But this, again, is not always the case, for it has been found at the Tay, which flows from Loch Tay—a sheet of water 14 miles long and three-quarters of a mile broad—that in heavy westerly gales the wind acting on so long a reach heaps up the water at the outlet, and, if combined with heavy rainfall, greatly increases the flood in the river. It thus appears that there are so many local circumstances which affect the frequency and severity of floods in different localities, that no rule generally applicable can be stated regarding them. What may be termed the *ordinary* floods of rivers generally occur with heavy rain and melting snow, for then the bed of the river has to discharge a compound flood made up of what is falling in the form of rain and what is draining off the land as melted snow. But *extraordinary* floods, affecting a limited area, may occur at any period in connection with thunderstorms, and it is the fact, that some of the most remarkable floods, such as that in the northern counties of Scotland in 1829, occurred in August, and were due, not to a sudden thunderstorm, but to the continuance of heavy rainfall over a large district of country, and in the instance referred to, $3\frac{3}{4}$ inches of rain fell between 5 o'clock on the morning of the 4th and 5 o'clock on the morning of the 5th of August. Various formulæ have been suggested for calculating the flood discharge due to a given area of land, but the information as to the amount of flood water said to have been discharged from different districts of country is so discordant, due no doubt to the varied physical conditions above noticed, that it seems to me to be impossible with elements so variable to found any formula that can be generally useful.

It may not be uninteresting to state, however, that the quantity of water passing off during high floods is variously given by different authorities at from 1 foot to nearly 100 cubic feet per minute per acre for the districts in which the observations were made. The highest gauging I have ever got was 15 cubic feet per minute per acre from a town district of 630 acres, after three days of nearly continuous rainfall. Thunderstorms, however, discharge a very much greater amount during their short duration, and it is stated that, in August 1846, during a thunderstorm in London, 3·3 inches fell in two hours and twenty minutes, being 85 cubic feet per minute per acre. I think that, with our present information, the only general result to be gathered from records of floods is, that *the flood discharge bears a higher ratio to the ordinary discharge in small than in large rivers.* This is due to the fact that in a small river a rainfall may affect and swell every one of its drains and feeders at the same time, whereas, in a larger river the rainfall may be confined to one district only, and thus the flooding is modified in its amount. It follows, therefore, that the smaller streams or burns intersecting a property at a place far removed, it may be, from the main stream, may, especially if their slope and sectional area be small, be subject to sudden and destructive floods bearing a very high ratio to their ordinary discharge.

But under whatever circumstances and to whatever extent the floods in rivers take place, their destructive effect on property is too well known to require illustration, and the means of securing the prevention or amelioration of such disasters cannot receive too much attention. In using the words prevention or amelioration, it is perhaps almost unnecessary to explain that I do not refer to floods of such calamitous and overpowering violence as that already alluded to, which occurred in Morayshire in 1829, and has been so well recorded by Sir T. Dick Lauder, as "bordering on the marvellous, and ruining property to an extent that defies calculation."* On that occasion the Spey, where fully a mile wide, rose 10 feet 2 inches, and where half a mile, 13 feet 9 inches. The Doveran rose 18 feet; the Dee in Braemar, with an average breadth of 130 feet, rose from 15 to 16 feet; and the Findhorn at some places rose as much as 50 feet above its summer water level. Such a visitation is clearly beyond all human control, but the remarks I have to offer refer to certain periodic inundations which, in some localities, are of occasional if not frequent occurrence, and are regarded as phenomena that may be expected at least every two or three years, almost as certainly as the biennial equinoctial spring tides of the ocean; and though the districts over which such occasional floodings extend may form but a small portion of the agricultural area of the country, still the very fact of their periodic occurrence to a greater or less extent in many rivers gives the subject a general interest.

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* Account of the Morayshire floods of 1829.

Perhaps it may seem almost unnecessary to say that flooding takes place when the combined sectional area of a river channel and the fall on its bed do not afford sufficient discharge for the passage of the drainage water. The obstruction due to deficient sectional area may be lessened, or perhaps altogether removed by enlarging the channel of the river, while that due to insufficient fall may often be removed by making a *short cut* instead of a long detour, as already noticed at page 135, and thus increasing the slope of the surface and the velocity of the current, and when such operations cannot be carried out, or do not either singly or combined afford sufficient relief, recourse must be had to artificial embankments.

In forming straight cuts to shorten a river's course and increase the fall on its surface, and, consequently, its velocity, care must be taken that the inclination be not so much increased as to produce a current so rapid as to injure the banks of the new cut; and as their liability to injury (as explained in treating of the abrasion of banks) depends on the materials of which they are composed, it is not possible to lay down any rule of universal application in deciding what rate of inclination may safely be adopted. The formation of a new cut or channel is, however, a work that should not be undertaken without careful consideration of all the circumstances, as such a work may in some cases prove injurious to the bed and banks below the point where it joins the original course of the river, and thus prove detrimental to the interests of adjoining proprietors.

I may here remark in passing, that the currents of large rivers vary as the place of observation is narrow or wide, and also as the flow is that of ordinary or of flood water, and that the velocity of such rivers as the Thames, the Tay, or the Clyde may, according to their different conditions of flood, be found to vary from about one mile per hour as a minimum, to about three miles per hour as a maximum velocity. Smaller rivers with steeper slopes have higher velocities. I have found the currents of such rivers as the Water of Leith, for example, in flood at places where the gradient of the bed varies from 25 to 32 feet per mile, to run at rates varying from 3¾ to 5¾ miles per hour. Still more rapid currents will be found where the bed is still steeper, until we reach the mountain torrent carrying everything before it in its rapid descent.

The details of two very good examples of checking the flooding of land by widening and straightening rivers, and thus increasing their power of discharge, are to be found in the Transactions of the Society—the one an account of the improvement of the pasturage lands on the Torran in Caithness, by Mr James Purves,[*] and the other a paper by Mr Blaikie on the Improvements of the Don in Aberdeenshire[†] But it is not often that the divisions between the properties of conterminous proprietors admit of extensive deviations of a river's course, and even when no such difficulty occurs, the formation of the country itself may render such a work impracticable. Proprietors are, therefore, generally obliged to resort to artificial embankments for the protection of their own lands, and such works are, as is well known, extensively employed for that purpose. Their proper construction has received much attention, as may be learned from the numerous papers describing them and their effects, as executed in different localities, which have appeared in the Transactions, among which I may refer to the communications of Mr Hamilton,[‡] Mr Udney,[§] Mr Menzies,[‖] and more recently to the papers of Mr Sutter,[¶] and Mr Milne,[**] communicated to the Society in 1858.

With reference to protecting banks, it may be stated that experience has shown that they should invariably be placed, if practicable, at such a distance from the edge of the river as to leave a solid foreshore. Care should be taken that no abrupt angles or bends be formed, but that their line of direction should be carried in easy curves. They may be composed of almost any firm material which will compact solidly together, the best perhaps being a mixture of clay and sand. All combinations of walls of masonry with embanking, which have sometimes been recommended, should invariably be avoided, as it is impossible to effect any proper bond or union between the earthwork and the masonry, and such composite structures are likely to result in failure. The surface of all banks, particularly that next the river, should be turfed, and the back slope sown with grass as speedily as possible, and no hedges, brush-wood, or trees should be planted on artificial embankments. When the subsoil on which the bank is formed is gravelly and porous, trouble may occur from the passage of water under the embankment, and, in such cases, it may be found necessary to sink a trench and fill it with clay puddle. The ordinary dimensions for such embankments are that they rise about 2 feet above flood level, that they have a top width of 3 feet, with a slope of 3 to 1 towards the river, and 2 to 1 towards the land; it will hardly be desirable to attempt to construct such defence flood embankments when they are likely to be exposed to a greater pressure than 4, or at most 5 feet, as their cost will then become too great, and the difficulty and risk of construction too formidable for private enterprise.

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[*] Series iv. vol. ii. p. 439.

[†] Series ii. vol. ii. p. 75.

[‡] Ibid. vol. ii. p. 97.

[§] Ibid. vol. vii. p. 100.

[‖] Ibid. vol. vi. p. 489.

[¶] Series iii. vol. viii. p. 317.

[**] Ibid. vol. viii. p. 427.

As the effect of all such embankments is to prevent the river from spreading over flat tracts of country, so their tendency is to cause a greater discharge and higher velocity through the natural channel of the river, and to increase the abrading power of the current on the bed and banks. Again, if the works of protection include only one side of the river, the result may be to increase flooding on the opposite bank, if it be not similarly protected. Hence such operations on the part of proprietors have led to serious legal proceedings, which renders it advisable not to embark in the formation of such works without careful consideration of the consequences.

The remarks I have offered refer, it will be seen, to works made purely in the interests of agriculture. But the beneficial effects which have followed extensive navigation improvements in lessening the floods in some of our large rivers are highly important and deserving of notice.

The works executed in improving the navigation of the lower reaches of the Tay, the Clyde, and the Tees, have lowered the level of the low-water line, and the power of discharging flood waters with an ebbing tide; and, accordingly, we find ample proof that the flooding of the lower districts of the towns of Perth, Glasgow, and Stockton, the ports of these rivers, is sensibly diminished both in frequency and extent. On the other hand, the danger of rashly obstructing the flood water channels of rivers is well illustrated on a large scale in many railway and road-works throughout the country, where lines of railway or road have been injudiciously carried across flat *haugh* land on solid embankments of earth-work. Cases must suggest themselves to the recollection of the reader, where great injury has followed the construction of such works,—injury which could only be remedied at great expense by enlarging the water-ways of bridges, and converting solid embankments into open viaducts for the free passage of flood water—a relief to the submerged land which I have recommended in several cases where I have been consulted.

SECTION III.

What has hitherto been said refers solely to regulating or controlling the flow of rivers. The next branch of the subject, embracing the reclamation of lands on the shores of estuaries, introduces a different feature; and although much that has already been said regarding currents and embankments will be found to apply to reclamations in estuaries, yet the lands we are about to consider in one respect at least differ from those already noticed, inasmuch as, being within sea mark, they are subject to all the influences consequent on the constant *flow* and *ebb* of the tides.

The object of such works is to reclaim those low lying sandbanks, mudbanks, and marshes to be found in all estuaries and outfalls of rivers which are left dry on the receding of the tide, and are thus, according to their level, rendered more or less easily convertible into pasture or corn-growing land.

It is not for the agriculturists of the British Isles alone that the subject of reclamation has an interest. Even in the United States of America, with all its vast tracts of unoccupied land, attention is now being directed to gaining land on the margins of the bays and estuaries on the eastern shores of the country; and the National Society of Paris have recently invited communications to be made to them during the year 1874, "on the embankment and reclamation of land from the sea." Still more recently, Mr Rintoul, of Kingston, in East Lothian, has suggested that our Government might profitably make use of the Crown right to the foreshores within high-water mark by forming sea embankments. That the subject is exciting much attention cannot therefore be doubted, and that reclamations have in certain situations and under certain circumstances been successfully carried out has been fully established. But it would be very erroneous to assume that every foreshore uncovered at low water may *profitably* be converted into arable land; and as there is reason to believe that much misconception exists on the subject, I have thought it might be useful to discuss at some length our experience of the methods adopted in forming reclamations, and the practical results which have been obtained under different physical circumstances.

The area reclaimed from the estuary of the Dee, which is now fertile land, was originally pure sandbank covered by all spring-tides, and utterly unavailable for any useful agricultural purpose, and as it is a good example of such tidal reclamations, it may be interesting to give a brief outline of what has there been accomplished. The River Dee Company, incorporated by Act of Parliament in 1732, has from time to time reclaimed from this tide-covered waste a large tract of land extending to about 4000 acres, which is now in full cultivation; and alongside this gradually gained territory the river has been conducted from Chester to near Flint, for the purpose of navigation, in a narrow canal of about 8 miles in length, and 400 feet in width. A considerable portion of land has also been reclaimed on the Flintshire side of the estuary, though not by the proprietors of the Dee Company; and it is believed that the aggregate amount which has, from first to last, been gained from the sea is about 7000 acres.

The process followed in carrying out these land-making works was to construct a high bank rising 9 feet above the level of high water, so as to confine the river to the south side of the estuary. The tidal water, which was admitted to flow freely between this bank and the north coast, gradually deposited layer after layer of sand and silt, and, in fact, shut itself out; and so soon as the surface had attained a sufficiently high level, a cross bank was constructed between the main embankment and the north shore, and thus the large area as above stated was *bit by bit* reclaimed. The reclaiming banks were gradually strengthened and pitched with stone on the outer face, and substantial self-acting sluices were formed, which close against the ingress of the rising tide, but being open at low water, allow the drainage water to escape from the reclaimed ground, some of which is still below the level of high water.

It may here be well, in passing, to observe, that land-making schemes constructed on such a principle prove generally injurious to navigation, and that of the Dee Company which I have described is no exception. But it is of greater importance, perhaps, to state that navigation improvements, as will be shown hereafter, may, if judiciously carried out, be made to promote the acquisition and protection of land as well as the interests of navigation, as for example, at the Ribble and the Lune in Lancashire, and thus to serve at once the twofold interests of navigation and agriculture. I know from experience, that had proprietors of land and conservators of navigations, in many tidal estuaries, worked harmoniously together in jointly carrying out such improvements as would have benefited both interests, much unnecessary litigation might have been prevented, and a result more satisfactory to both parties might have been attained. Such a land-making scheme as that of the Dee can be successfully taken up only by a powerful company. But many useful reclamations have been effected without recourse to such extreme measures, advantage being taken of a slow and almost unseen process, whereby, under favourable physical circumstances, aided sometimes by the help of very slight appliances to hasten and secure the deposit, the surface of the banks is gradually raised by the alluvial matter left by each receding tide, and it is often in carrying out these isolated and gradual reclamation works, that the interests of proprietors and conservators come into collision, and that a joint plan of works would be very desirable.

The gradual process of reclamation to which I have alluded as so often resorted to by proprietors, is termed "warping." The tide is permitted to flow freely over the surface, and whatever matter is deposited at slack tide contributes to the accretion, so that the rate at which the process of reclamation goes on must depend on the quantity of matter held in suspension and the shelter of the situation, so as to give sufficient duration of still water for its deposit.

The amount of matter held in suspension varies, as may be readily supposed, in different estuaries; in some situations it is derived from the action of the sea on a wasting line of coast, in others from alluvial matter brought down by the river, and in most cases, perhaps, from both of these sources of supply. The size of the detrital particles carried by the currents of estuaries or rivers depends on the velocity of the stream, the nature of the bottom along which the detritus is moved, as well as the shape of the particles of which that detritus is composed, and varies with the special circumstances of each locality. Observations have been made on the quantity of solid matter held in suspension by different rivers, and repeated by various authors; but these observations have invariably been made in water taken from the main stream, and cannot be held to apply to such cases of reclamation as we are considering, the substratum of which is slob composed of the finest silt, and submerged only by sluggish currents, incapable of leaving anything but the finest matter deposited on its surface. It has been stated that marshes on the Seine require twelve years to rise to the level of high water, thirty years on the Bay of Vays, and eighty years on the Scheldt, and similar variations are to be found in statements made by various authors. Mr Oldham * states that at Sunk Island, on the Humber, the reclamation was hastened by constructing a temporary or preliminary bank with a sluice, and permitting the tidal water to flow over the land at high water, when the sluice was closed, and the whole of the mud held in suspension deposited, after which the sluice was raised so as to allow the water to escape, leaving behind its load of rich deposit. In this way he obtained in two and a half years a deposit of three feet. The most rapid deposit which has come under my own notice, was near the mouth of the Avon, at the Severn, where the channel between Dumball Island and the shore was silted up to the extent of 32 feet in seven years. As a general rule, I have found that the heavier sands and deposits are found on the banks at the mouth of the estuary, and the particles are lighter as we recede inwards.

Such reclamation of land, however, as is due to the deposit left by the free and unobstructed flow of the tide is a very slow process, because in proportion as the banks rise, they

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* On Reclaiming Land. By James Oldham, Min. of Proc. of Inst. of Civil Engineers, vol. xxi.

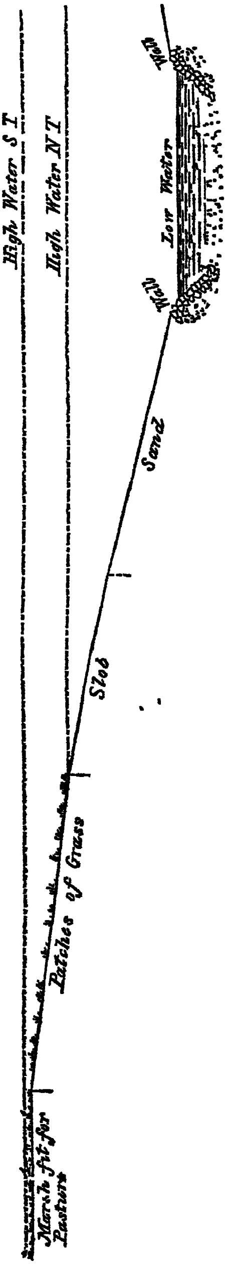

Fig. 7.

are more seldom covered by the tide, and, moreover, the materials deposited in the higher parts of the banks are exceedingly fine, being carried only by the slack water of highest tides, and it is not until the surface has attained a pretty high level that it can be regarded as land in any agricultural sense. It has been very generally found in open estuaries where the reclamation is permitted to go on undisturbed by encroachments of the river, that vegetation, in the form of patches of aquatic plants, begins to appear when the bank has reached the level of high-water mark of neap tides. As it rises above this level, its surface will be found to be more or less covered with patches of vegetable growth up to high water of spring-tides, where the vegetation attains a continuity and the land a firmness from the roots of decaying plants, such as to entitle it to be termed "marsh-land," and when the surface is not covered with reeds and rushes it is fit for grazing. Below the neap tide level, again, the surface is what is called "slob," consisting of sand covered with mud, with no vegetation whatever, and lower down there will be found sand more or less pure according to the situation. The disposition of those different limits will be seen from the accompanying section, fig 7. The upper or "marsh" portion of the section corresponds to what in England are locally termed "salt-marsh" and "outmarshes," and in Scotland simply marshes. The aquatic plants growing on these marshes are found to vary according to their position. If near the sea the plants predominating are those which flourish in saline soils, such as marsh samphire, sea-pink, &c. If the situation be more estuarial, and more within the influence of fresh or brackish waters, reeds, sedges, flags, and rushes will prevail. The surfaces of these naturally formed tracts of ground are, as may be gathered from what has been said, on a pretty high level. I found the marshes of Salt-area, Coleway, Ovangle, and Overton on the Lune, and of Clifton, Howie, and Hesketh on the Ribble, to average about a foot below high water of ordinary spring tides.

In connection with this gradual accretion and formation of land, and the sudden changes which, if unprotected, it sometimes is destined to undergo, it may be interesting to the geologist to state as having come under my own observation, that a sandbank covered by every tide may, by a happy diversion of the river, become in a few years useful pasture land; while, on the other hand, by another capricious change of the river's course, the apparently permanent pasture meadow, the growth of years, may suddenly disappear in a few tides, and the spot where cattle have been grazing to-day may to-morrow once more be the main channel of the river. Instances of such sudden changes I have witnessed both on the Ribble and the Lune before the courses of these rivers were controlled and directed by proper works.

In my treatise on "River Engineering" I have shown that in many cases the interests of navigation and agriculture are identical, and that the erection of training walls, such as shown in fig. 7, by guiding the river, and thus improving the navigation, may, at the same time, greatly promote the interests of agriculture, by rendering such wholesale destruction as that to which I have alluded impossible, and by converting reclaimed marsh land into *permanent* property.

On the Tay and at other places the process of warping is hastened by driving double rows of open pile work, and filling the intervening space with faggots of brushwood weighted down with stones. This has been found to hasten the deposit, and as the surface rises additional faggots are laid down, till the whole is sufficiently elevated to warrant the exclusion of the water. Sir John Richardson has paid much attention to this on the Tay, and has communicated his experience to the Society's Transactions.* He advocates especially the filling up of runs or waterways caused by the running off of the receding tide, by running lines of stakes and faggots across them, and advises that these cross lines of stakes should be made lower in the centre, with a rise towards both ends, so as to prevent the water from escaping round the ends, and so forming new channels. He also strongly recommends all surface water from the adjoining land to be led by catchwater drains clear of the land proposed to be enclosed, or if that be impracticable, by a properly constructed outlet through it, so as in any case to prevent the water flowing over the surface of the marsh or slob land. Sir John Richardson tried very successfully the planting of small patches of bulrushes over the slob land, but from my experience as to the growth of vegetation in such situations as above stated, the planting of patches of bulrushes or marsh samphire need not be attempted at a lower level than about the high water of neap tides, and it does not appear that this was done on a lower level on the Tay. The tenure by which such marsh lands are held has been shown to be uncertain, excepting in estuaries where the river is confined by training walls; but even after such navigation works have been executed the land is still submerged by every high tide, and though this is not found to injure it for pasture, it renders it quite unavailable for tillage without works specially constructed to afford protection from floods, and provide for effectual drainage. The erection of all such works cannot be too carefully considered, and even after they have been constructed they have to be closely watched, and are often kept in repair at a constantly recurring expenditure. The remarks I have made at page 136 regarding the construction of river flood embankments apply generally to those for reclamation, and I need not repeat them here; but the cross section of such works must, of course, in all cases be regulated by the exposure.

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* Series ii. vol. vi. p. 298.

In making estuarial reclamations, it is of importance to determine how soon marsh land may be considered fit for enclosure, and on this point my experience leads me to conclude that it is in general inexpedient to attempt to enclose land by permanent banks until, by gradual deposit and subsequent accumulation due to the decay of vegetable matter, its surface has reached about the level of high water of *ordinary* spring tides. I do not say it may not be done before this level is reached, for land has, within my own knowledge, been enclosed at a considerably lower level on some parts of the Tay, where the marshes covered by reeds in sheltered places were found to be fit for enclosure, though covered to the extent of from 3 to 4 feet at high water, and on the Forth still lower slob lands have been inclosed. But, as a general rule, it is safe to assume *that the higher the level of the land the greater is the chance of successful reclamation.* The inducement to place a protecting bank in deep water, is, of course, the enclosure of as large an area as possible. But greater extent of area may prove of little or no advantage if the larger portion of the enclosure is mere "slob" on a low level requiring a long period for its accretion. Above all, such enclosures require banks of great height and strength, which are more liable to be damaged, both in the course of construction and after completion, than a more unpretending, but perhaps in the end far more useful work formed in shallower water. I have found, in estimating the cost of banks proposed to be founded on a low level, that the agricultural gain was not commensurate with the cost and risk attending their construction, while in some cases they would have proved prejudicial to navigation. Generally speaking, indeed, proposals to build banks in deep water including a large extent of "slob" have, in my experience, been found to be fallacious. But even though the reclamation be restricted to marshes that have attained a pretty high level and a fair solidity of surface, there are low "gulleys" or "swashways," as they are variously locally termed, kept open and deep by the flowing and receding tide; and if these gulleys are large, it is often troublesome to carry the embankments across them, for as the opening comes to be contracted by the gradual formation of the bank, the scour and depth of water are increased. In dealing with such cases, it may be found advisable, instead of closing the gap by extending the bank from either side, to deposit on the bottom fascines loaded with stones, and to bring up the whole surface of the bank across the gulley gradually.

In making enclosures in front of rapidly rising high land, difficulty may be experienced in consequence of land-water from a higher level finding outlets within the embankment, and thus interfering with the thorough drainage of the reclaimed land,—an inconvenience which is not so likely to occur in such enclosures as are made in front of low lying tracts of country.

The time that must elapse before such enclosures may be expected to become ready for the exclusion of the tidal waters must, as we have seen, vary with the situation, the rate of accretion depending on the amount of suspended matter in the water and other circumstances, and even after the exclusion of the tide, a considerable period elapses before the land is ready for tillage. Many extensive tracts of "salt marshes" are never enclosed, and although covered to a depth varying from a few inches to a foot during high tides, they afford excellent pasture. But if the land is to be cropped, the water must, as already noticed, be wholly excluded.

The treatment of reclaimed marsh or slob lands in order to fit them for the purpose contemplated by their enclosure, belongs specially to agriculture, and not to engineering, and I am unable to offer any opinion which could be of any value on that subject. But, I think, it would be unpardonable were I to omit all reference to this important matter, especially as it has been very fully, and I should think judiciously, treated by the late Mr John Wiggins, F.G.S., in his treatise on "Embanking Lands from the Sea." I therefore offer no apology for giving the following extracts from Mr Wiggins' book:—

"The various modes by which embanked lands may be brought into a state of cultivation depend chiefly on the nature of the soil. We are therefore now to contemplate an intake securely embanked, with sluices of sufficient capacity to take off the drainage down to 18 inches below the general level of the surface of the intake. These are essential conditions on which alone the work of cultivation can be commenced with any hope of success, and these conditions being strictly fulfilled, we now proceed to agricultural operations according to the nature of the soil, which may be classed as *clayey*, *sandy*, and *loamy*, each of which will require a somewhat different treatment in some respects, though in other matters the treatment applies to all. Thus, for instance, in the first agricultural operation,—viz., that of enabling the soil which has so lately been supersaturated with salt water, with all its chemical combinations, to part with so much of its saline and other particles as may be in excess for the purpose of vegetation, or in other words, to *freshen* the soil sufficiently for land plants to thrive upon it,—the process will be the same upon all these soils, and this process consists in forming a series of surface drains by which the drainage waters may run off, carrying with them such portion of the saline and other particles as they may have been enabled to dissolve and take up or absorb.

"But such channels and drains are to be made, not only with the view of freshening the soil, but also in such manner as to answer the ulterior purposes of fences, and of drains timely to carry off the surface waters.

"The fences of an intake are usually marsh ditches or dykes* of sufficient width and depth to prevent cattle attempting to cross them, and an intake seldom admits of any other description of fence. Such water fences and drains must, in the first place, be drawn all round the intake, *i.e.*, from the sluices by which the water is to escape along the land side of the sea bank or wall, and along the edge of the higher lands of the adjoining country. Having surrounded the level with these fences and drains, the next operation is to divide it into marshes of such convenient size as may be judged most judicious; and this size will be partly governed by the soil,—clayey soils parting with their salt most reluctantly, and sandy soils most easily. It will also be more strictly governed by the size most convenient for occupation in the particular locality, and also by the desire to save expenses; but in general, sandy marshes may be considerably larger than other soils, and there may even be some advantages in leaving the interior of the level for some time without subdivision, since it will be by no means wise to hasten the process of freshening by sudden saturation, but on the contrary, to allow a considerable period of time to elapse before any thought of cultivation is entertained, and during that period to allow the level to remain *sodden*, only leading the surface waters away gently into the circular dykes already described; and it may be very judicious to fill up the nearest of such hollows with the stuff out of the circular dyke. This soddening or stagnation of the soil in a watery state is considerably more applicable to sandy soils, and to such of those as have before embankment been covered by every tide, than to clayey soils, and will be quite unnecessary in such high fringes or salts as have only been occasionally covered by the tide. But the benefits of allowing the soil to remain for a length of time under the influence of stagnant fresh water are great, since it affords time for the decomposition of such animal and vegetable matter as the sea may have deposited in it, macerates and dissolves the calcareous, shelly, and other such matter, and even reduces the siliceous matter into a state of subdivision resembling clay; and it amalgamates all those heterogeneous particles, takes off their crudities, promotes or prepares them for chemical combination, and reduces them to a state fit for the purposes of fresh-water vegetation. We, however, disapprove any attempt at suddenly freshening the soil, and consider that even the soddening process recommended should be conducted with great care and caution, always gradually, but neither allowing the water to remain too copiously nor too long, nor suffering it to run off too quickly; for this purpose, therefore, cuts or channels should be made from the lowest spots of the level into the circular dyke, so that no water should remain absolutely stagnant if it could be got off, but that at the same time it should only be drawn off gradually. Thus, supposing the whole level could be channelled within the first year after shutting out the sea, and this was done only 12 inches deep, these channels should be allowed to remain at that depth a full summer and winter at least, before deepening them another 6 inches, bringing them to the ultimate depth of 18 inches; gradual freshening and maceration being essential to future fertility, and this requiring a long time in proportion to the quantity of saline matter, with reference to vegetation, at the period of its embankment."

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* Dyke in Scotland means a dry stone wall; in England a ditch.

"Thus we have brought the level into this state, viz., it has a marsh dyke or water-fence surrounding it, and very numerous channels throughout its surface leading the waters into the marsh dykes, to the depth of 18 inches below the general surface. The depth of the soil, we may now suppose, has been somewhat increased by the soil taken from the channels being spread about. By this time several brackish plants, partly of a maritime and partly of a fresh water nature will have appeared, and partially covered the surface in places; these may be grazed to advantage, and as the surface soil freshens, it may be harrowed, and Dutch clover and ray grass may be sown and rolled in, wherever the absence of other plants may allow of them; first, however, bestowing but a small quantity of seed by way of experiment, and increasing this as success may encourage from time to time. In a period varying from three to seven years, according to the tenacity of the soil and its height above the tide, the level will be fit to bear corn and pulse. If its surface be coarse and uneven, and its soil tenacious and stubborn, or what is called marsh clay, it may be judicious to dig it over and level it at the same time, preserving, however, the channels already dug; taking in the first instance a crop of rape, which might judiciously constitute the first crop, and may either be saved for seed or fed off, and be succeeded in either case by oats, beans, and wheat; but even after the digging of such soils, they will require much tillage, so as to thoroughly mix and pulverise them, and the bean crop should be repeatedly well hoed and weeded. With good treatment, however, such soils bear heavy crops of wheat and beans in succession, and when some degree of exhaustion calls for a relaxation of cropping, the course of fallow, oats, clover, wheat, beans, will give all the produce that can reasonably be expected from any land, the crops very commonly grown on good soils of this kind being eight or ten quarters per acre of oats, four to six quarters per acre of wheat, and about the same of beans. This produce, however, must not be reckoned on as over the whole surface ploughed and sown with these crops; for at least one-eighth to one-fifth thereof will be still too crude, too salt, too wet, or too stubborn to bear perhaps any crops, or at most but one-fourth of what is borne by the best parts. This drawback, together, with the expenses of cultivating this description of land, soon points out that grass, not tillage, is its most profitable ultimate destination, and accordingly it is found expedient to prepare it for the true and legitimate purpose of an intake, viz, grazing. But we must not fall into the error that because this is the last, it may also be the first destination of the land, a course of tillage being requisite for a time upon all the *argillaceous soils* in order to mix and incorporate them, and to pulverise the soil, so as to bring it into a fit state for the production of the better kinds of grasses, otherwise the coarser will predominate, and the value of the ground be much deteriorated. In proportion, therefore, as the course of tillage is perfect without being continued to exhaustion, and as the levelling and surface draining are well performed, so will be the productive value of the grazing marsh which succeeds the tillage. Nor are these operations sufficient in stiff clayey soils; such will require to have their tenacity subdued or lessened, their working rendered easier, and their pulverisation or admixture of parts more effectual by the application of chalk. This supply of calcareous matter will also act as a manure, and will not only increase its quantity of wheat, but also tend much to improve its quality, to stiffen its straw, so as to prevent or check its lodging, and the consequent deterioration of the grain. In these various ways an expense of L.5 per acre thus incurred will soon be repaid, whilst its beneficial effects on the soil will last at least twenty years, even under a succession of cropping, but in grass would be permanent."

"The more siliceous soils, whether sandy or loamy, require less chalk if any; and as their texture is apt to be rather too open than too close, lime is often much better adapted to them, if any manure be at all needful, since an intake of soils of this kind generally abounds with shelly fragments, enough to supply the requisite quantity of calcareous matter. It may, however, be well worthy of consideration, whether a supply of lime would not be advantageous in setting to work that calcareous matter, and consolidating the texture of the soil. The period of tillage should be limited to such a space of time as may be sufficient, according to the nature of the soil, to bring it into a fit state for the best grasses to grow to perfection. This, on *stiff clay* lands, may be reckoned as—1, oats; 2, beans; 3, wheat; 4, beans; 5, wheat; 6, clean fallow; 7, oats; and lay this crop down with grass seeds."

"But on good *silty loams* a different mode and duration of cropping may be adopted. Upon such lands, along the coasts of Norfolk and Lincolnshire, the usual course of cropping is,—1, beans; 2, oats; 3, wheat; and they get better wheat after the oats than before, the straw being less bulky, and less liable to 'go down.' But even in the case of such soils, if the argillaceous particles are in such abundance as to produce an unctuous texture, or slipperiness under the feet, when rather wet they may judiciously be subjected to the rotation prescribed for clays, and treated similarly."

"There must, however, be a very great difference of treatment with regard to those slight, loose, sandy soils, of which some spots of the intake level will be found to consist, when taken from the low slobs of a sandy shore which has been covered by every tide. Such loose sands, *if blowing when dry*, should be fixed as soon as possible by any feedable grass that can be made to grow upon them, until a better sward can be produced. On such loose spots the *Agrostis maritima*, or *seaside fiorin*, has grown luxuriantly, especially when the *stolones* have been planted in a wet sod of bog turf, and that trodden into the sand. The shoots from these sets have been extremely vigorous; the cattle have sought and eaten them with avidity; and the treading thus induced has fixed the sand, whilst the droppings of the cattle, containing the undigested seeds of other grasses, have soon brought up a good sward wherever the drainage was sufficient for its establishment."

"In such cases of loose sand no tillage can judiciously be contemplated. Such soils are already sufficiently open to part with their excess of saline particles, and are generally sufficiently homogeneous not to require admixture by stirring, unless it be by harrows on the surface to let in the Dutch clover seeds that may, with propriety, be sown thereon, when that brought by cattle shall be permanent enough to show an aptitude in the soil for that plant. These seeds, after being thus sown in moist still weather, should be rolled down, and if the soil has been well drained and freshened, it is more than probable that a good grazing marsh will be established at less expense and in less time than could be effected by any other means, since if the clover thrives, the cattle will lie so constantly on those spots as to enrich them more than any others."

Mr Wiggins concludes by saying, that " the great and leading points for the guidance of the adventurer in reclaiming his intake are the following:—To freshen gradually; to drain effectually; to cultivate perfectly; to crop moderately; to look to grazing ultimately; and to lay down to grass carefully."

Even with all the difficulties that beset the subject, there can be no doubt that the daily recurring sight of large tracts of banks left high and dry by the receding tide, suggests the very natural idea of easily excluding the sea and extending the land. It is difficult, indeed, to suppose that any proprietor on the banks of a tidal estuary can be indifferent to such a prospect of adding to his fields, and hence attempts at such reclamation works on varying scales of magnitude are, we may say, almost universal. But though the process may seem easy, and the object very tempting, it is a great mistake to suppose that these estuarial tide-covered banks can, in all cases, be converted into arable or even pasture land at a cost commensurate with their future agricultural value, or to assume that in order to increase the arable land of the country, all we have to do is to steal it from the ocean. On the contrary, as shewn by practical experience, the return for investment of capital on such improvements is always uncertain, and has proved in many cases utterly insufficient. But in all such questions the most reliable and valuable information is that which is derived from practice, and I have therefore been at some trouble to obtain authentic accounts of several reclamations, most of which have been brought under my own notice in connection with navigation works, and I offer no apology for laying them at some length before the reader. They refer, as will be seen, to reclamations formed under very different circumstances as regards locality and construction, and being founded on observations made by reliable independent authorities, who are personally cognisant of what they state, they must be regarded as valuable records of ascertained facts. Some instances will be found of reclamations, on a small scale in favourable situations, being highly satisfactory, while similar works in less favourable localities have not proved so successful. It further appears that the larger class of *modern* reclamations do not as yet seem to have afforded very satisfactory financial results when viewed as agricultural schemes. While the most successful reclamations are those where, in the first instance, the foreshore has been accreted by extensive training walls, constructed to improve navigations, and having the effect of raising the banks on either side of the estuary to the level of high water of neap tides, and thus rendering the subsequent reclamation-works comparatively easy and inexpensive. In such cases, however, it would be obviously quite fallacious to value the cost of reclamation at the comparatively small outlay required to protect and drain land, that has already been raised by navigation works to such a level as to be covered only by high spring tides. These records will, I think, be found most fully to bear out the views I have already stated, which may be briefly summarised in the following general propositions:—

First, That in order to insure success, the space to be reclaimed must be within the influence of water containing much alluvial matter, and not on the shores of an open sandy estuary.

Second, That the spaces to be reclaimed should be allowed to receive the deposit left by the tide for as long a period as possible, and the water should not be entirely excluded until they have, by gradual accretion, attained the level, if possible, of high water of ordinary spring tides.

Third, That by properly conducted survey and observations, the amount and fertilising properties of the deposit should be ascertained in order to determine,—*first,* over how many years the process of reclamation is likely to extend; and, *second,* what may be the productive value of the soil deposited.

Lough Foyle.

The first case which I shall cite is Lough Foyle—a situation where the amount of salt water greatly preponderates over the fresh, and where extensive reclamations have been made under power granted by Act of Parliament. It is, in fact, a reclamation scheme, and I have received, from Mr G. Henry Wiggins of Londonderry, some notes regarding it, from which I extract the following interesting information:—After the salt water had been excluded, shallow surface drains were formed, and in about two years rye-grass grew pretty freely, but exceptional spots remained barren for some time. The grass was followed by oats, which improved as the salt left the soil. Deeper draining allowed the cultivation of flax and clover. Afterwards, on still deeper draining, all ordinary crops began to grow well,—wheat, beans, turnips, mangold, and carrots, but all requiring as much manure as any old upper land. These slob lands yield a great return for manure, but must have manure on the lower and damper portions. Fiorin grass grows well without manure.

Whenever the ditches have so far drained the soil as to allow of its becoming cracked and open to the air, the crops begin to increase in produce. But the full value of the soil is never known until thoroughly under-drained with tile or stone; it then yields excellent crops of almost any produce, clover and rye-grass for hay being perhaps the most profitable. Grazing the land does not answer, except from the middle of May to the beginning of September; after this the soil is too cold and damp for the beasts to lie down, and they begin to fail.

The expense of these intakes on the Foyle may be taken at about L.20 an acre to get them from the sea, the expense of bringing the land, when got into cultivation, will come to at least L.10 more, making a total of L.30 per acre. The best lands are worth from 50s. 'to 40s. the Scotch acre, and the lowest and wettest parts perhaps not more than 10s.—say 30s. as a fair average. To this has to be added the expense of keeping up the banks and pumping water. The above remarks may be held generally to refer to reclamations made about the same time on Lough Swilly, and certainly do not present encouraging views as to these reclamations viewed as a mercantile speculation.

Morecambe Bay.

The reclamations made by the Ulverston and Lancaster Railway in Morecambe Bay were rapidly formed by the embankment for carrying the railway, which was made in pretty deep water. Like the Foyle, there is also a great predominance of sea water. From G. Drewry, Esq., of Holker, in Lancashire, I have been favoured with the following information:—A portion of the land enclosed by the railway in 1856 was grassed over, and the remainder was sand without any vegetation on it. After it was levelled it was divided into fields by open ditches and iron fences. The ditches had to be made very wide at the top in order to get them to stand. The land was then drained with 3-inch pipes, each drain opening into the ditch on each side of the field. The tiles were embedded in peat moss, to act as a filter to prevent the sand running into them. The sand is so fine that, without this precaution, the drains would have filled up very quickly. The drainage is the great difficulty, as the pipes are very apt to fill up after every precaution has been taken.

On the portion which was grassed over before it was enclosed two crops of oats were first taken, and then it was green cropped. It grew for a few years good crops of wheat, beans, and clover, as well as Swedish turnips and mangolds, but though a great quantity of manure was used the crops fell off, and at present it is nearly all in grass. The portion which was bare sand when it was enclosed was treated in the same way, except as to the first two crops of oats. It was green cropped after it had been enclosed about two years. After the railway was made there was no means for silting that portion of the enclosure which was sand. The tide was entirely kept out. Had it been admitted the lands would have been much more valuable and much higher. We would then have had better drainage and a richer soil. That portion which was grassed over at the time it was enclosed is still much the best.

When land is reclaimed from the sea, the first thing to be looked to is a good outfall for the water, and when it is possible no doubt it is very desirable that the land should be silted up gradually. In our case this could not be done, as the reclamation of the land was a very secondary affair, it being a railway, and not a reclamation scheme.

The Dee.

I have already described the works of the River Dee Company. My own opinion is, that had they been originally designed as low rubble training walls to guide the channel by judicious lines through the estuary, instead of confining it by a high embankment to the south side, it would not only have been better for the navigation, but more for the interests of the Dee Company. However, the following extract from a letter addressed by W. J. Hamilton, Esq., the chairman of the company, in 1845, to the Tidal Harbours Commission, who were then holding an inquiry at Chester, describes the financial position of the company as follows* :—" The citizens of Chester, not having either the means or inclination to make any efficient improvements of their harbour, certain individuals, afterwards incorporated as the River Dee Company (in 1732), undertook to do so on having, as a compensation for the outlay of their capital, a grant of the White Sands, then of no value whatever, with the right of imposing tolls for the use of the improved navigation. Upon this agreement the undertakers laid out nearly L.80,000—a large sum one hundred years ago—in making the present channel and outlets for the river in lieu of the numerous streams through which the river at that time flowed over the estuary, upon which outlay the original subscribers received no dividends or return for nearly the first fifty years, and those who have since represented them have been receiving a dividend gradually increasing to 4½ per cent. per annum, which is now at last paid on each L.100 of original stock. Had that capital been originally invested at interest in the Government Funds, or upon mortgage, it would, at the end of the first fifty years, during which no return was received upon that expenditure of capital, have amounted to a sum far above the present value of the River Dee Company's estate.

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* Tidal Harbour Commission, 1845, p. 318.

"This statement of facts will, it is hoped, be sufficient to satisfy yourself and your colleagues (the letter is addressed to Admiral Washington) "that the company's bargain has not been so highly beneficial to them, nor so very prejudicial to the citizens of Chester, as has been represented. I do not think it necessary to refer further to the additional outlay incurred by us from time to time after the original expenditure of L.80,000 in improving and maintaining the present navigation, but I will rest satisfied with assuring you that the River Dee Company has derived no other return from that outlay than the dividend before stated, and such prospect as they have of gradually and slowly, and not without additional expenditure of capital or income, reclaiming farther portions of this estuary."

The Tay.

I have already referred to Sir John Richardson's experience on the Tay, where the enclosures, on account of the limited depth of water, and the favourable circumstances in which they were made, were much more likely to lead to satisfactory results than the cases I have cited. The water of the estuary of the Tay, where Sir John Richardson's reclamations were made, is highly charged with alluvial matter, the slob lands are on a pretty high level, and there were one or two small islets in front of the property separated from the shore by shallow channels, all contributing to successful reclamations. Sir John Richardson has kindly communicated the following notes regarding them:—

The first faggot dyke was run across to Cairnie Island in 1808-9, and 50 reclaimed acres (Scots) were under crop in 1826. The first crop was oats, which was rent free, and it paid the whole cost of the embankments (L.1400). The first ten years were alternately white and green crops, and had one or two dressings of lime, but no manure was required, and then a four shift rotation commenced. The *reclaimed* land continues to be more fertile than the adjoining land, which is also of excellent quality —less manure is required for the reclaimed land, as some virgin soil continues to be blended with the upper stratum when the land is ploughed. To make it *perfect* it requires a little more silica to strengthen the straw, which is scarcely stiff enough to stand upright in a favourable season. On the whole, the operation has, in my case, been extremely profitable, and when exhausted it can be refreshed by warping with the tidal waters.

The Lune.

Aldcliffe Marsh lands, on the Lune, extending to 160 acres, were enclosed in 1820, and I am indebted for the following notes regarding them to the proprietor, Edward Dawson, Esq. of Aldcliffe Hall. "The land enclosed was previously an old marsh, a good part of it covered with rushes. As it approached the tide there was more silt, and it was partly covered with sward and pastured with sheep.

"The whole was ploughed in 1821, being the spring after its enclosure, and sown with oats, which proved a very fine crop. This was succeeded by a four-course rotation, and continued in crop till 1855, when it was gradually laid down in grass, as more profitable than the cultivation of corn. It still remains in grass, with the exception of ten acres. I consider the land quite equal to the ancient enclosed land."

This enclosure refers to land having had a long period for accretion, being an "old marsh." The training walls on the Lune, which were completed in 1851 by Messrs Stevenson, have had the effect of fixing the channel, so as to allow the marshes to extend their limits, but no additional land has been enclosed by embankments in consequence of the navigation works.

The Humber.

The Humber, as already noticed, is a river largely charged with alluvial matter, and Mr Oldham states the following as his experience, in the 'Proceedings of the Institution of Civil Engineers:'—"Soon after the exclusion of the tidal water the marine grasses and vegetation begin to die and decay, and in the course of one or two years fresh-water grasses appear; after the lapse of about three years a tolerably good surface of pasture is naturally formed. But that which is most surprising is the spontaneous appearance and the growth on the enclosures of Sunk Island of an entire covering of white clover, which presents itself within three or four years of the date of the exclusion of the salt water. Where the land is destined for crop the first sown is rape, about the third or fourth year after the enclosure, and the produce is usually of extraordinary quantity and vigour. The following season oats or beans may be sown, and then wheat; and perhaps of all districts of England the largest and best crops may be found on Sunk Island, for the tenants admit that the land produced upwards of six imperial quarters of wheat per acre. Flax also is produced of a fine and valuable quality, and in large quantities. The producing power of this description of land is not limited to the growth of cereals or fibrous products, but the finest roots, such as potatoes, turnips, mangold wurzel, &c., are successfully cultivated. The climate is mild through the winter, but it is hot in summer. The rainfall averages 18 inches per annum, and the harvest is frequently from one to two weeks earlier than in the surrounding country." Mr Oldham states the cost of the reclamation of these lands as varying from L 5 to L.20 an acre.

The Ribble.

It would be difficult to find a case presenting more favourable features for easy and profitable reclamation, on a reasonable extent, than the Ribble, in Lancashire.

The Ribble Navigation Company in 1838 obtained an Act for the improvement of the river, under the advice of Messrs Stevenson, by whom the works were afterwards executed.

The only portion of these works to which it is necessary at present to refer is the guiding of the channel by low rubble training walls, which confined the navigable channel to a fixed course, and, at the same time, allowed the tidal water to flow freely over the banks on either side of the estuary, as will be understood by referring to figure 7, at page 148. The anticipated effect of this was to encourage the deposit of rich alluvial matters on either side of the estuary, and as this deposit would no longer be subject to encroachments by the river, it was expected that ultimately a belt of marsh land would be formed all along the shores. The Act directed that a plan of the banks of the estuary should be made before the commencement of the works, and that a similar plan should be made every tenth year thereafter, showing the quantity of land gained from the river within each such period of years. It further enacted that at the end of every successive ten years three persons should be nominated—one by the Ribble Navigation Company, another by the owners of the adjoining land, and the third by the two persons so nominated—as arbiters to fix the quantity of land so gained, to settle its value, and fix the annual rents to be paid to the company by the landowners.

By a subsequent Act, obtained in 1852, the company were directed to make a statement of the amount of land then gained, and at the end of every five years thereafter; and landowners were declared to be entitled to the right of pre-emption in the event of their wishing to become owners of the reclaimed land *ex adverso* of their property.

Mr Garlick, engineer to the Ribble Navigation Company at Preston, has kindly furnished me with the following details, showing how this arrangement has been carried out, and its results:—

	A.	r.	p.
Up to the year 1853 there had been regained, .	913	2	4
1853 to 1858, ...	760	1	12
1858 to 1863, ...	590	1	18
1863 to 1868, ...	335	0	2
Total, .	2599	0	36

Generally, but not in all cases, the landowners fronting the reclaimed land have claimed the right of pre-emption. With the exception of two portions, almost the whole of the land reclaimed by the company's works remains open out-marsh, and is covered at high tides.

Sir Thomas Hesketh purchased the reclaimed land in Hesketh on the south side of the river, and has excluded the tide from about 700 acres by a sea embankment. Half of this land was the new reclaimed land, and the other half was out-marsh in 1838, when the Navigation Company got their Bill.

On the land embanked in at Hesketh there have been immense crops of all kinds of farm produce, and the land has let at a high rent. There was a heavy crop of wheat the first year after the exclusion of the tide.

The frontagers in Freckleton and Newton, on the north side of the river, did not claim the right of pre-emption, and the reclaimed land became vested in the Ribble Company, who seven years ago embanked 550 acres of this new land; and the tide has been excluded from it ever since.

The land of the company in Freckleton and Newton was, as soon as embanked, let on a lease for twenty-one years in one farm at a yearly rental of L.3. per statute acre, the tenant paying rates and taxes, and doing all other work, the company maintaining the embankment. In the spring of the year, after the tide had been excluded from the land, it was ploughed and cropped with oats, potatoes, carrots, and turnips, and all were good crops. In the second year wheat was an excellent crop, and all sold for seed, turnips and carrots were extra good crops, oats and barley, ryegrass and clover very full, asparagus plentiful and rich—beans sufficient in straw, but yielded nothing, being the only exception to the productiveness of the land. This second year the Royal North Lancashire Agricultural Society held the trial of all kinds of implements on the farm. The rotation of cropping may be stated as green crop, wheat, ryegrass and clover, oats, then green crops again; but in this part of Lancashire the rotation depends altogether on the seasons, which are so variable as to affect the state of the land, and necessitate changes in the intended course of cropping. That part of the reclaimed land embanked which has been lately devoted to pasture has grassed satisfactorily. Flowers, strawberries, gooseberries, apples, &c., grow in the gardens, and indeed almost everything that is grown on a cropping farm flourishes on this reclaimed land when enclosed from the sea. The land here alluded to was mostly grassed over before being enclosed (being nearly at the level of high-water of spring tides), and the foregoing observations as to cropping must be considered as referring to such enclosures, and not to low raw land from which the tide has been early excluded.

The Nith.

Low training-walls were constructed by Messrs D. & T. Stevenson on the Nith for the improvement of the navigation, which were completed in 1863. Part of the wall extended in front of a bay of slob land belonging to the estate of Kirkconnell, and I have a letter from A. Maxwell Witham, Esq., the proprietor, in which he says:—The training-walls which you put in the River Nith have greatly improved the navigation. The effects of these works on the foreshore of Kirkconnell, after an experience of 10 years, Mr Witham describes as follows:—"What was formerly marsh has not been enclosed; it remains as before. Some portion of what was formerly slob has gradually and very slowly grassed over. No part has been enclosed, or is ever likely to be. The cost of embanking to keep out the spring tides would be too heavy. Moreover, such land pays best in the short grass which grows on it, impregnated as it is with salt from the tidal water."

The Forth.

For an interesting account of the enclosure at Tulliallan, on the Forth, I have to refer to the paper by the late Mr William Menzies, in the Society's Transactions, already quoted. The first reclamation, of 152 acres, was completed in 1823. The second, of 220 acres, was completed in 1838. Mr Menzies' paper, which was written in 1838, does not treat of the financial results of these works, and I applied to Mr John Menzies, of Inch farm, to learn if he could throw any light on that branch of the inquiry. In reply to my letter, in speaking of the last made reclamation, of which he has the most knowledge, he says "it cost the estate between L.18,000 and L.20,000. As a speculation, I am afraid you cannot say it pays. My father did everything in the shape of bringing the land reclaimed under cultivation, and I have heard him express the opinion that it never came to carry crops until it was once properly swarded with grass, and if he had sown it all out at first it would sooner have yielded him some return. It never paid him as a tenant."

The Tees.

Two extensive reclamations have been made on the Tees in connection with the navigation works of the River Tees Conservancy Commissioners, and I am indebted to Mr Fowler, the engineer of the Commissioners, for the following information regarding them.

The accretion at Haverton has been going on since 1837, and was induced by the groins erected by the Navigation Commissioners. In May 1860, after a lapse of twenty-three years, the foreshore having been raised to the level of high-water of neap tides, the works of enclosure were commenced, and in February 1863 the water was excluded from 150 acres of land at a cost of L.9800, including interest on the outlay, but exclusive of any allowance for the cost of the navigation works. Seventy acres of this land were grazed in 1867, and cropped with oats in 1868, and subsequently with grass, oats, carrots, and potatoes. Eighty acres were sold for manufacturing purposes at L.8626, 14s. The portion under tillage is rented at L.200 per annum.

The Eston and Tod Point reclamations were commenced in 1869, and the water was excluded in 1871 from 585 acres, at a cost of L.16,494, special facilities having been offered for making the embankments of slag from the iron furnaces. About one-half of the land is grassed over, and the other half is sand, and the whole enclosure was valued by arbitrators as available for manufacturing purposes at L.113,925.

Neither of these reclamations can be viewed as agricultural improvements, the chief inducement being to obtain sites for public works, and they probably would never have been undertaken but for the facilities afforded by the expensive works of the Navigation Commissioners, and the refuse from the iron-works.

Such are the results of some important reclamations made under different physical circumstances and financial arrangements. To what extent the estuarial shores of the country can be further reclaimed, so as to prove profitable agricultural speculations, without injury to navigation, is a very wide question, of which engineers take different views.

Mr Hyde Clark, in a paper on the "Engineering of Holland," published in Weale's Quarterly Papers in 1844, says—"The following moderate estimate will show the large area available for the enterprise of our capitalists and the skill of our engineers :—

England—	Humber, &c.,	40,000	acres.
	The Wash,	60,000	"
	Suffolk and Essex,	40,000	"
	Hampshire and Dorsetshire,	10,000	"
	The Severn,	30,000	"
	Cheshire and South Lancashire,	50,000	"
	Morecambe Bay,	40,000	"
	The Duddon,	10,000	"
	Solway,	20,000	"
		300,000	"
Ireland—	Loughs,	300,000	"

"The total extent in the two countries cannot be estimated at less than 1000 square miles, or 600,000 acres, worth at the lowest average L.20 per acre, though most of it, as in Morecambe Bay and Lough Swilly, would be worth L.60 per acre."* The total value of reclaimed land would be between twelve and twenty millions sterling.

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* The information I have received, it will be seen, does not warrant such a conclusion.

I give these figures to show what large views have been propounded as to the practicability and prospective value of reclamations on the shores of this country. But I think some of the facts I have stated on the authority of gentlemen intimately acquainted with the details of each case regarding reclamations *actually made*, such, for example, as Lough Foyle, Lough Swilly, Morecambe Bay, the Forth, and the Dee, do not present much encouragement as to the prospective value of enclosures made on a large scale; whereas such enclosures as those on the Tay and the Ribble, where the deposit was not unduly hastened, but left to the gradual action of the tide, are found to afford satisfactory results. Moreover, Mr Clark's views, as his paper indicates, are given apparently irrespectively of the interests of navigation, as he seems to contemplate reclaiming the shores even of the Mersey, though he very truly adds that to make such an attempt would create a "panic." Now, however important it may be agriculturally to gain acres from the sea, it can never, in my opinion, be justifiable to convert sea into land to the detriment or injury of the free navigation of our rivers and harbours, and it must ever be a duty of our Legislature to see that navigation is not sacrificed to agricultural speculation. But I have, I think, shown that the extent to which reclamation can be carried as a *profitable* agricultural speculation is really very limited, and that if such reclamations are made on sound engineering principles, they do not necessarily interfere with navigation.

In accordance with these views, I stated in the first edition of my treatise on River Engineering, published in 1858,—"With reference more particularly to the operations of landowners, it is notorious that in many cases attempts to reclaim or protect property have led to serious and costly legal proceedings between landowners and the local conservators of navigations; and this, we are sensible, has in some instances arisen from a feeling on the part of the landowners that their operations could not be regarded as prejudicial. The local conservators, on the other hand, have generally no means of knowing what the ultimate intentions of the landowners are until their operations have proceeded so far as to render it impossible, if the interests of navigation require it, to stop or to remove the works without considerable loss. A difference of opinion has thus been raised, which has too often ended in an expensive lawsuit. We have long held the opinion that it would in many, if not in all, of our estuaries be most desirable to have a line of conservation marked out by the Admiralty (without whose authority no encroachment can be made within high-water mark),* for the regulation of all works for the protection of land. Were such a line defined, the landowners could then with confidence, and without risk of challenge, enter on such works within the line of conservation as they considered necessary for the protection of their property, and a source of much difference of opinion and expensive litigation would be at once removed. It is obvious that were such a duty to be performed, it must be committed to a duly qualified commission, so composed that the protection of navigation and the interests of landowners should be fully represented."

Since that date a Royal Commission has determined the legal boundary-line between sea and river salmon fishings in all the estuaries of the kingdom. This was a delicate duty, affecting the rights of many proprietors, and settling questions that had long afforded ample discussion and many trials in the law courts, but it has been done by the Salmon Fishery Commission. I do not see why, in many cases at least, a similar commission should not usefully be employed in deciding in what estuaries reclamation is consistent with the interests of navigation, and if so, to what extent it may be carried.

SECTION IV.

In more open and exposed estuaries than those we have been considering, and all along the exposed sea-shores of the coast, the works of reclamation or protection assume a more formidable aspect, and must be considered under the *fourth* branch of the subject, viz., *Defence against the inroads of sea waves.*

The first remark I have to offer on this subject is, that in all cases of such exposure the works should never be of so *aggressive* a character as may be prudent in sheltered estuaries, as it is a dangerous policy to attempt to encroach on the sea-coast within high-water mark, excepting with works of a solidity and cost proportionate to what they have to resist, and this, I may safely say, will, in almost all instances, be found to be greatly in excess of the agricultural value of the land reclaimed. In illustration of this, I may quote a case where a road had been formed along a sea-beach for a considerable distance round the boundary-wall of valuable agricultural property. In this case I found it advisable, on investigation, to recommend the proprietor to abandon the acquired tide-covered space, also to relinquish a portion of his arable land as a site for a new road on solid ground, and to build new fence-walls, as being far less costly than a sea-wall sufficient to protect the roadway against the possible damage due to the coincidence of heavy storms with high spring tides.

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* This authority is now vested in the Board of Trade.

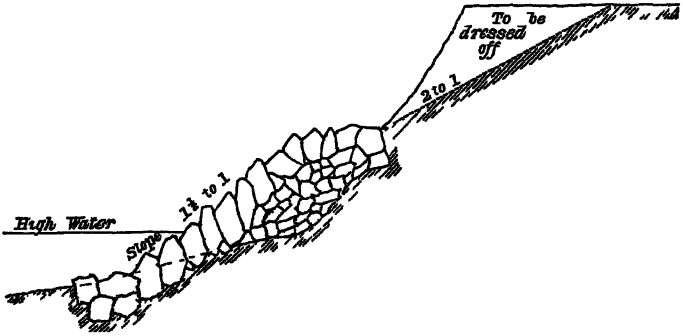
It is no doubt true that by the erection of costly groins and other works, such as at Sunderland, Leith, and elsewhere, land has been successfully gained for the construction of docks. But the expense in such cases has ranged from L.2000 to L.3000 an acre. It is also true that the engineer is often called on to construct extensive sea-walls for the protection of roads and railways involving interesting questions of marine engineering, but it is obvious that this is a class of works which cannot with any propriety be considered as belonging to agricultural engineering, and, therefore, they do not fall to be considered here. There are, however, tracts of country raised but little above the high-water level, and, therefore, liable to be submerged during excessive storms, where works, not of *aggression,* but purely of *defence,* are not only warranted, but are essential for the protection of agricultural land. I may refer, in illustration of what I mean, to one case on the shores of the Bristol Channel, where large tracts of low-lying pasture, extending for a distance of about five miles along the coast, are the most valuable lands in the country, bringing exactly twice the rental of the tillage lands in the district. These low-lying lands, though above ordinary high-water level, are nevertheless exposed, when high winds and high tides coincide, to be flooded by a very prejudicial inundation, and would, if not protected, ultimately lose their present high value as pasture land. This, then, belongs truly to those cases of *defence,* and not of *aggression,* which I conceive may be legitimately dealt with in the prospect of the result, even in an agricultural point of view, being satisfactory; and on such cases I have still to offer a few observations.

Where rubble stones, as they come from the quarry, can be cheaply procured, they will be found, in most cases, very valuable as a defence against inroads of the sea. The proper size of the rubble, unless the exposure is very great, may vary from one to three cubic feet, and should have a sufficient quantity of smaller pieces to fill up the interstices. A trench should be cut in the beach as a foundation for the rubble mole, and the stones should be deposited roughly, without being built or arranged. The stuff excavated in forming the foundation should be thrown up inside of the mole, and mixed with stones, shivers, or quarry rubbish, as a backing for the rubble stones. The land above the mole should be sloped back and turfed, or sown with grass seeds, and after storms any of the rubble that has been drawn down by the waves should be at once replaced with additional rubble, till the whole has acquired stability.

The accompanying cut, fig. 8, shows the nature of this work as actually executed by Messrs D. and T. Stevenson, on a pretty extensive scale, to protect carse lands in exposed situations, and

I refer to it as a style of defence, varied, of course, to suit particular exposures and localities, which may very generally be successfully applied where stone can be easily procured.

In some places, such as the mouth of the Humber, the inroads of the sea have been successfully resisted by occasional groins run out from the beach; and it may, in many cases, be prudent, as a first measure, to ascertain the effect of groins, as in the event of their proving successful the expense of any continuous line of defence may be saved. In so far as my own experience goes, however, isolated groins do not generally prove a satisfactory defence, and have to be supplemented by longitudinal work of some description. I may, as exemplified in several places where groins have been tried on the shingle beaches of the southern shores of England, refer to one instance of this coming within my own experience at the Bristol Channel, already noticed, where jetties run out at right angles to the high-water line had long been tried without good result. I found that in heavy seas the waves were led along the jetties, and struck with great force in the corner where they joined the beach at high-water mark. I further found that the shingle of which the beach is composed was heaped up on the *western* sides of the groins by prevailing westerly winds, while it was heaped up on the *eastern* side of the groins by winds which had prevailed from the east. The groins, therefore, in that particular situation, did not tend to encourage a uniform deposit of shingle, which shifted from side to side, according to the wind, while the exposed face of the groin, from which for the time the shingle had been removed, acted most injuriously by presenting a decoy to the sea right up to high-water mark. These *high* isolated jetties were therefore removed, and a continuous line of piling, parallel to high-water mark, was substituted, presenting no obstacle to



the run of the waves along its surface. Occasional lines of *low* jetties were put in front of the higher continuous pilework to arrest the shingle, and the ends of these low jetties were at some places, where the scour of shingle was greatest, connected by lines of low piling parallel to the higher continuous piling; and this mode of construction has proved very successful, not only in encouraging a more uniform collection of shingle, but also in preventing the run of the sea, during high tides, overtopping the shingle beach and deluging the adjoining lands. In proof of this I may state that, on making an examination after the occurrence of an unprecedentedly heavy storm, accompanied by high tides, I found that wherever the continuous upright piling and planking had been constructed, there was no influx of anything beyond spray upon the adjoining land, but that at all other parts of the coast (which is about six miles in length), where the face of the beach was sloping, and the upright piling had not been applied, the water passed freely over in considerable depth, carrying drift timber far into the fields, and in some places heaping up heavy shingle on the land to the depth of two or three feet. It was evident, therefore, that the problem to be solved was to oppose an obstacle which should *throw back* the sea, even at the risk of its beating somewhat heavily on the face of the pilework and rising in pretty heavy spray above it, provided the passage of large bodies of water on the low-lying land could be prevented. The cuts 9 and 10 show this work

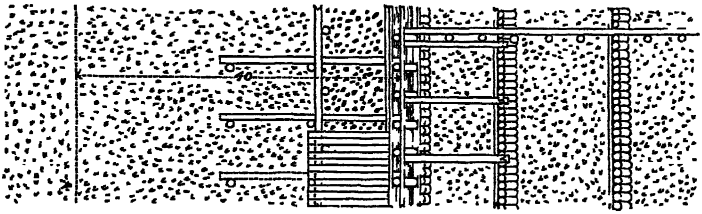


Fig. 9.

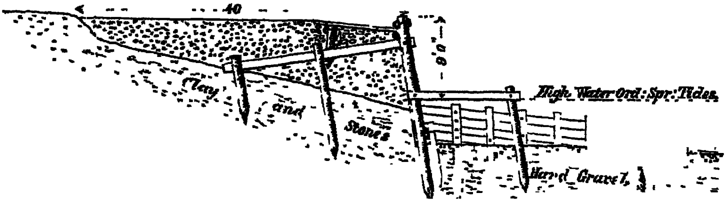


Fig. 10.

as it was executed in plan and section, from which it will be seen that the main defence against the inroad of the waves consists of a continuous line of nearly perpendicular piling and planking, rising to the height of nine feet above high water, while the shingle is encouraged to collect in front of this line of timber walling by low groins and lines of connecting stakes, which, when filled by shingle, the waves seem to have no tendency again to scour out.

Occasional reference has been made to drainage, and this is, perhaps, the natural place to say *generally*, that in all such cases of estuarial reclamation and coast defence as we have been considering, it is essential that the engineering works should embrace a proper system of drainage. Main and cross drains, of sufficient capacity and fall, must be formed and led to one or more outlets through the embankments. The outlets of these drains must be provided with self-acting sluices, to close at high tides, but to afford an escape for the drainage at low water. The discharge of such drains, it need hardly be added, must vary in every case with the drainage area and rainfall of the district to be provided for, and their sufficiency to discharge the requisite amount will depend on the fall that may be found available, and whatever that may be, it will regulate the cross sectional area of the drains themselves. The whole of the works of the drainage should be carefully designed, on due consideration of the *meteorological*, *geographical*, and *engineering* features of each separate case, and the offlets, tunnels, pipes, and sluices should be executed under proper supervision.

Much of the success of such drainage works, I may add, depends on the selection of a favourable site for the discharge of the drainage water, especially on exposed beaches composed of shingle or gravel. The force of this remark may perhaps be well illustrated by a reference to the rivers Lossie and Doveran, on the Moray Firth, where the shingle is thrown up by the sea in such quantities as completely to overpower them, and consequently these rivers discharge into the sea at points very distant from what might be regarded as the natural position of these outlets. Fig. 11 shows this action at the Findhorn; and fig. 12 the same action at the Lossie, both on the shores of the Moray Firth, and in both cases it will be seen that the outlets of the rivers are driven to the westward, the heaviest seas on that coast being caused by easterly and north-easterly gales; and if this be so in the case of large rivers draining large districts of country, it must be obvious that the discharge of drainage water connected with ordinary agricultural improvements on sea-coasts having a similar geological formation, must be more liable to interruption, and should therefore be carefully considered. In proof of this, I may state that I have known a drainage outlet, constructed at a large cost near the high-water mark of a shingle beach, rendered quite inoperative by the same heaping up of shingle as I have described. The current was altogether unable to force a passage through it, and an outlet had periodically to be made by

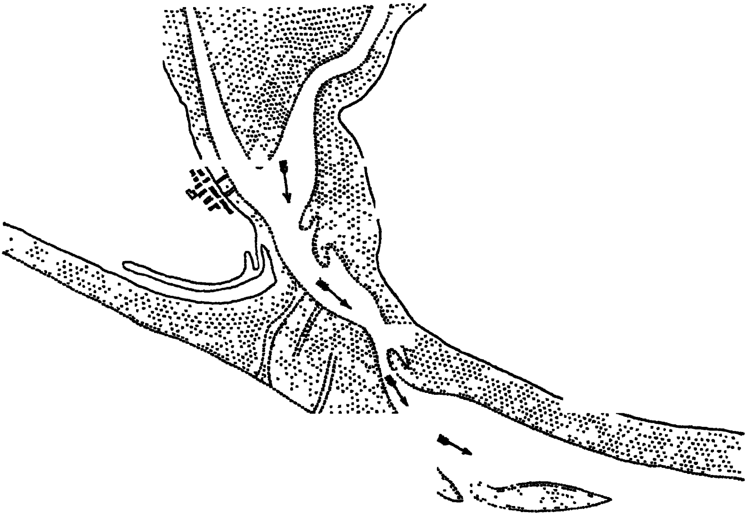


Fig. 11.

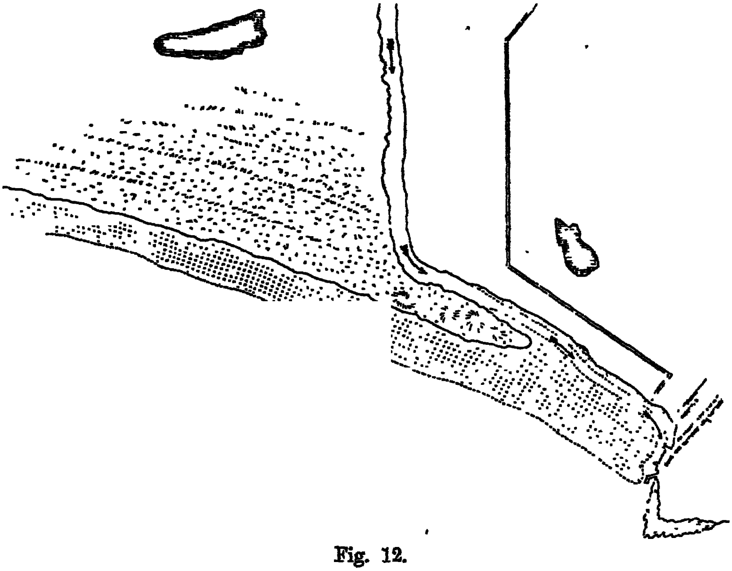


Fig. 12.

manual labour, at considerable expense, to prevent flooding of the land. Whereas, had the outlet been formed on a lower level, and carried out to low water, it would not only have been clear of the detrital matter thrown up by the sea, and forming the line of beach, but would have had the advantage of the greater scour due to additional head at low water to remove any obstructions that might be thrown up opposite the outlet.

In addition to these, which may be properly styled works of defence against aggression, and may therefore legitimately be regarded as coming within the province of ordinary agricultural engineering, the section of the subject we are now considering naturally embraces those gigantic reclamations which now form large portions of Holland and Denmark, and the Fen districts of England. I do not, as stated in the outset, propose to treat of such undertakings, which can only be accomplished by national resources or by powerful public companies. The protection of Holland, a country which has been called "the gift of the ocean," is believed to have cost upwards of L.300,000,000 sterling. The sea-dykes of Schleswig and Holstein, in Denmark, are stated to protect about 900,000 acres.* The Romney Marsh, the first of England's reclamations, has an area of 70,000 acres. The Fen lands of Lincoln and Norfolk are computed at 600,000 acres. But, to learn the history of these gigantic English reclamation and drainage operations, the reader must refer to the writings of Sir W. Dugdale in 1652,† and of W. Elstobb in 1793;‡ and interesting details regarding the reclamations in Holland and Denmark are to be found in papers in the Proceedings of the Institution of Civil Engineers, by Mr John Paton, C.E.,* and Mr John Henry Muller of the Hague; § and also in Mr Hyde Clarke's paper on the Engineering of Holland, in Weale's Quarterly Papers.

It is well to notice, however, that though these extensive schemes differ from the more humble works we have been considering, as regards the larger area reclaimed or protected, the general principles on which all such works are based are of universal application, so that, in fact, the same conditions, engineering and agricultural, apply to the defence of a few fields on a farm exposed to the sea, as to the protection of Holland, which, equally with the smaller work, owes its existence to the constant watching and maintenance of its sea defences. But, of course, the similarity being only in *condition*, and not in

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* On the Sea Dykes of Schleswig and Holstein. By John Paton, C.E., Min. of Proc. of Institution of Civil Engineers, 1862.

† History of Embanking and Draining of divers Fens. By Sir W. Duggdale, 1652.

‡ A Historical Account of the Great Level of the Fens. By W. Elstobb, engineer, Lyne, 1793.

§ On Reclaiming Land from Seas and Estuaries. By John Henry Muller, Min. of Proc. of Institution of Civil Engineers, 1862.

degree, the actual difference between the two classes of works is very great. The mere fact that, in addition to the drainage of such enormous districts, viewed simply as an engineering question, the safety of thousands of inhabitants of large towns has to be provided for, gives to the reclamation schemes of such countries as Holland—with all their sea-dykes, sluices, canals, and pumping engines—an importance that undoubtedly places them in the foremost rank of hydraulic engineering works.

ON THE COMPARATIVE ADVANTAGES OF APPLYING MANURE TO THE STUBBLE IN AUTUMN, OR IN THE DRILLS IN SPRING, FOR TURNIPS, POTATOES, OR BEANS.

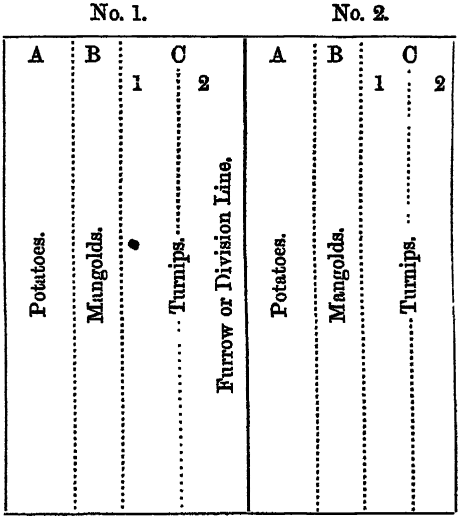
By THOMAS FARRALL, Dovenby, Cockermouth, Cumberland.

[*Premium—Twenty Sovereigns.*]

GREAT diversity of opinion at present exists among agriculturists as to the best time of the year for applying farm-yard manure in order to produce a maximum green crop. The usual mode of applying manure to green crops is to deposit it in the drills immediately under the seeds in spring, but it is occasionally spread upon the surface of the ground before the first ploughing, in the preparation of the land in autumn or the beginning of winter. The object of this report is to show the comparative advantages of each system. On some soils autumn manuring has been found to answer admirably, its effects on the crop having been proved to be as great as the more common method of application in the spring. It is no doubt a disadvantage that the manure is not immediately available in any considerable quantity for the support of the young plants in the first stages of their growth, although after having made some progress, the rootlets spread in all directions, and every portion of the manure becomes available. A combination with some of the portable manures is here of service, as the application of them in small quantity at the time of sowing the crop will push forward the young plants, until the manure, which is incorporated with the soil, becomes available for their maintenance and support. It may be remarked that, as a rule, autumn manuring answers best where the land is in good condition, as poor hungry soils require the largest available quantity of manure applied immediately to the growing crops.

In the autumn of 1870 the reporter made up his mind to test the different practices by actual experiment. Sloping towards the shores of the Solway Firth is a fine tract of alluvial land resting upon a blue lias clay; the elevation about 130 to 150 feet above high-water mark, and distance from the seaboard about eight to ten miles. This was fixed upon as the seat of the first experiment. The farm upon which it was conducted is cropped under the six-course shift—that is to say, first year, green crop; second, wheat; third, seeds, usually cut for hay; fourth and fifth, grass, depastured by stock; and sixth, oats. On the 27th of September 1870 a rectangular field of 195 yards in length and 149 yards in breadth, or about six acres in extent, the soil of which is remarkably uniform in character, was set apart for the experiment, and divided into two equal portions by means of a furrow drawn from top to bottom at a distance of 74½ yards from each side. See Diagram I.

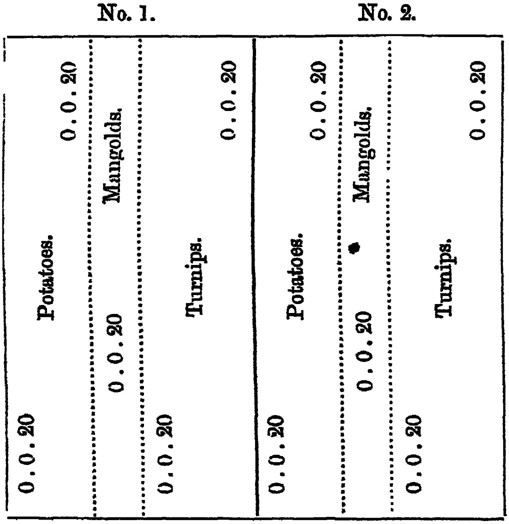
DIAGRAM I.



Well-made farm-yard manure, to the extent of 60 tons, was then spread upon the western portion (No. 1), after which the whole of the field was ploughed with a light furrow, not exceeding 4 or 5 inches in depth.

Nothing further was done until the 8th of March 1871, when two teams of horses were sent in to cross plough the field with a very deep furrow, after which it was harrowed and cultivated until it had attained the necessary degree of tilth for cropping. The two plots A, A, were then thrown into drills of 30 inches in width; and a few days later, one acre of each plot was planted with potatoes—Regents and Skerry blues—the eastern section (A) having first received 20 tons of manure. The remainder of the plot No. 2 also was manured with 40 tons before the turnips and mangolds were sown. On the 19th of April the two sections marked B, B, each containing half an acre, were sown with mangolds (Mammoth Red), and on the 4th of May the remaining portions, C, C, were sown with Skirving's purple-top swedes, the eastern halves, marked C 2, receiving, in addition to the farm-yard manure, 3 cwts. of specially prepared artificial turnip manure. Very little difference was noticeable in the appearance of the various plots of potatoes and mangolds during the whole period of growth, but from the first the spring-manured turnips took the lead on the portion which had received no artificial. Towards the latter end of October, four parcels, each containing 20 perches of potatoes, were measured off, and the tubers dug up and sorted into four baskets, representing respectively table potatoes, seed ditto, small ditto, and diseased. The prices of Regents in the autumn of 1871 were:—Table potatoes, 8d. per stone; seconds or seed, 5d.; small, 3d.; and diseased, 1½d. Skerry blues would be about 1d. per stone less, except the small potatoes, which were of equal value.

DIAGRAM II.



The following table shows the results of the experiment as regards potatoes:—

TABLE I.

		Table.	Seconds.	Small.	Diseased.	Total.	Value.	Value per Acre.
		c. q. lb.	c. q. lb.	c. q lb.	c. q. lb.	c. q. lb.	£ s. d.	£ s. d.
Autumn Manured	Regent,	8 3 14	1 2 7	1 0 2	4 3 5	16 1 0	2 19 4½	23 15 0
	Skerry,	10 0 16	3 1 5	2 1 3	None	15 2 24	3 0 8	24 5 4
Spring Manured	Regent,	7 1 27	1 3 24	0 3 13	6 2 22	17 0 2	2 14 11	21 19 4
	Skerry,	11 1 4	3 2 6	2 2 3	None	17 1 13	3 7 2	26 17 4

The above results show that by spring manuring the largest crops can be raised, and it is therefore the best practice in descriptions not liable to be diseased; but for ordinary crops, the safest plan is undoubtedly to manure in autumn, inasmuch as the tubers are sounder when they are not brought into close contact with the manure.

Apart from the requirements of this report, it may be interesting to notice that immediately after the potatoes had been cleared off, the mangolds were pulled, the tops cut, and the soil neatly scraped from the roots. 20 square perches were then measured off from each plot, and the produce weighed, with the following results:—

TABLE II.

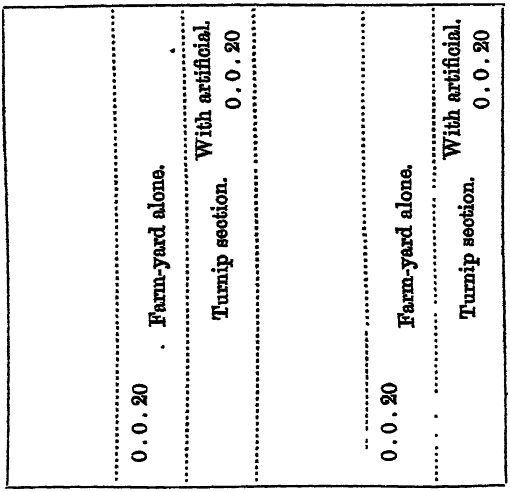
	Weight of Portion.	Weight per Acre.	Value per Acre.
	cwts. qrs. lbs.	tons cwts qrs. lbs.	£ s. d.
Autumn Manured	55 1 19	22 3 1 12	29 11 2
Spring Manured	47 2 7	19 0 2 0	25 7 4

The results in mangolds show very much in favour of autumn manuring. Not only was the aggregate weight larger, but the roots were much better shaped. This is attributable to the fact that, as soon as the roots of the young plants touch the bed of manure, they throw off fibres in all directions, instead of penetrating the cultivated soil below. It may be mentioned that the plants were left nine inches apart at the time of singling, and that the produce has been calculated at 2d. per stone, or L.1, 6s. 8d. per ton.

As the autumn of 1871 proved fine, the turnips were allowed to stay in the fields until Martinmas, when four equal plots were staked off as shown in Diagram III., the turnips topped and tailed, and brought to the scales with the results shown in Table III. Of course it must be understood that each plot measured one-eighth of an acre, as in the case of potatoes and mangolds.

DIAGRAM III.

No. 1. No. 2.



It may be remarked that the turnips which had artificial manure applied rapidly developed into rough leaf, and so escaped the ravages of the turnip beetle, while those planted with farm-yard alone had a severe struggle for the mastery, especially those on the autumn-manured portion. The roots on this land, however, showed less finger-and-toe throughout; indeed, there was scarcely a single root affected, while the spring-manured land contained a large proportion, thus testifying that hot manure applied in spring predisposes to this pernicious

TABLE III.

		Weight per Plot.			Weight per Acre.				Value per Acre at £1 per ton.		
		cwts.	qrs.	lbs.	tons.	cwts.	qrs.	lbs.	£	s.	d.
Autumn manured	Farm-yard alone,	40	1	5	16	2	1	12	16	2	4½
	With artificial,	60	1	22	24	3	2	8	24	3	7
Spring manured	Farm-yard alone,	45	0	12	18	0	3	12	18	0	10½
	With artificial,	54	2	11	21	16	3	4	21	16	9½

disease. The most striking result in the turnip experiment is the marked difference between the crop produced on the land which had a supply of portable manure, and that which had not; in the autumn-manured section over eight tons per acre, while the difference on the spring-manured land amounted to less than four tons! Evidently land on which farm-yard manure has been thoroughly incorporated with the soil requires a supply of artificial as a stimulant to the plants in their early stages, after which the farm-yard manure becomes available, and is, without doubt, better plant-food than newly applied manure, hot from the dunghill.

As soon as the turnips had been cleared off, the land was thrown into rigs for the wheat crop. On the 1st of December three imperial bushels of Chidham wheat per acre were sown, and the land well harrowed, and guttered to take off the winter rains. Although the seed was not put into a very dry bed, the plants were strong and healthy on their first appearance, yet, perhaps, a little thin on the ground; however, in the following spring they tillered satisfactorily, and gave promise of a heavy yield. On the 30th of August 1872 the entire crop was cut by a reaping-machine, but, owing to the unfavourable weather, it was not ingathered till nearly the end of September, when it was taken into the barn, thrashed, and the grain dressed ready for market. For convenience sake, the result of one acre in each plot is given, although the whole of the produce was measured and weighed.

TABLE IV.

	Produce of One Acre.		Weight per Bushel.	Seconds.		Value per Acre			Value of Seconds.			Total Value per Acre		
	bush.	pecks.	lbs.	bsh.	pk	£	s.	d.	£	s	d.	£	s	d.
Autumn manured	37	2	65⅓	1	1	15	0	0	0	5	0	15	5	0
Spring manured	38	1	62½	1	3	14	0	6	0	7	0	14	7	6

The grain produced upon the autumn-manured ground, though slightly inferior as regards quantity, was decidedly superior in quality, weight per bushel, and money value. The selling price was 64s. per quarter, while the other only realised 58s. 8d. The seconds in both cases were used for feeding stock, and the value has been calculated at 4s. per bushel. The straw was tied up in bundles or lappets of 7 lbs. each, the plots producing 912 and 1304 respectively, or at the rate of 304 and 326 per acre. These were not disposed of, but the usual selling price is 2d. per lappet, or 4d. per stone. The following table gives the exact money value of one acre of white crop from each plot:—

TABLE V.

	Value of Grain.			Value of Straw.			Total Value.		
	£	s.	d.	£	s.	d.	£	s.	d.
Autumn manured	15	5	0	2	10	8	17	15	8
Spring manured	14	7	6	2	14	4	17	1	10

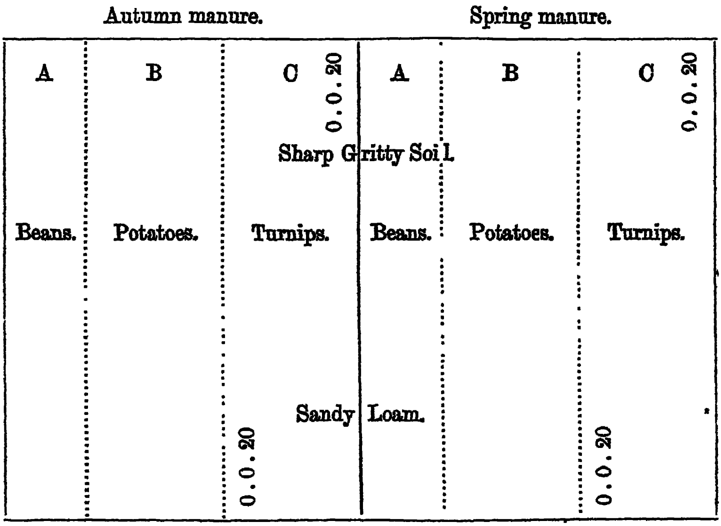
On reference to the above tables, it plainly appears that the spring-manured land gives the best results, as regards bulk, both in straw and grain, but the autumn-manured crops are of better quality, and therefore worth more money in the market. Table VI. gives the entire money value of the potatoes, mangolds, turnips, and wheat grown upon each portion of three acres during the two years in which the experiment was conducted:—

TABLE VI.

	First Year.									Second Year.						Two Years.		
	Potatoes (1 acre).			Mangold (¾ acre).			Turnips (1¼ acre).			Wheat. (3 acres).			Straw (3 acres).			Total (3 acres).		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Autumn manured	24	0	2	14	15	7	30	4	5½	45	15	0	7	12	0	122	7	2½
Spring manured	24	8	4	12	13	8	29	18	3	43	2	6	8	3	0	118	5	9

Not exactly satisfied with the results in the above experiment, so far as they applied to the green crop, the writer determined to test the application of manures in autumn and spring still further. In the autumn of 1871 a second site was fixed upon, for the purpose of continuing the experiment, or rather for the purpose of making another experiment. The holding upon which it was carried on is situated 25 miles from the sea, the soil being somewhat sharp and gritty, and resting upon gravel. The farm is managed on the five-course shift; that is to say, first year, green crop; second, principally barley and oats, with grass seeds; third and fourth, grass; and fifth, oats. The field selected for the experiment slopes towards the River Eden, and as the soil is not so uniform in character as that in which the first experiment was conducted, the produce was weighed from portions representing as nearly as possible the different classes of soil. The field was again of a rectangular shape, measuring 1245 by 803 links, and containing nearly ten statute acres. In the month of September, 1871, one-half of the land was manured with well-made farm-yard manure—at the rate of 18 tons per acre—from cattle fed in boxes upon cut grass, vetches, clover, and a little extraneous food, composed of a mixture of cotton cake and maple pea in equal quantities. The manure was much better than that usually found in the farm-yard, inasmuch as it was made during summer, when very little straw is usually mixed with it; but in order to give a fair trial to the experiment, a portion of the dunghill was kept until spring, quite separate from the winter manure, and 18 tons per acre forked into the drills as required when the ground was planted. After the western section of the field had been manured, the ploughs were sent in, and the whole of the ten acres turned over with a rather strong furrow soon after Martinmas.

Diagram IV.



Nothing more was done with the land until early in the spring of 1872, when one acre of each plot was prepared for beans. These were sown in drills 16 inches apart, and as the weather favoured their growth in a remarkable degree, the straw attained a length of three to four feet on the loamy soil, and the produce was good throughout. The results are shown in Table VII.

The yield of beans is greatly in favour of the autumn-manured portion. The straw was not weighed, but, if anything, the spring-manured plot would give a larger quantity, although the actual value of the difference would be trifling.

In the last week of April 1872, the plots marked B, B (Diagram IV.) were thrown into drills of 32 inches wide, and planted with Dalmahoy potatoes. Each of the plots measured two acres, and were treated in precisely the same manner, with the exception, of course, that the eastern section was manured in the drills. The plants came up vigorously, the spring-manured portion, however, always taking the lead, inasmuch as the haulms were more rampant, the leaves larger, and the colour a much darker green. By the end of August disease made sad ravages, and it was thought that scarcely a sound tuber would be ultimately saved. A few dry days, however, early in October, enabled the produce to be lifted, and after having been thoroughly dried and sorted, the produce from four parcels, each 20 perches, was weighed on the 23rd of the month, with the results given in the annexed tabulated statement:—

TABLE VII.

	Produce per Acre.		Weight per Bushel.	Estimated Value.		
	bush.	pecks	lbs.	£	s.	d.
Autumn manured	40	2	64½	10	15	2
Spring manured	35	1	64¼	9	7	3

TABLE VIII.

		Table.			Seconds.			Small.			Diseased.			Total.			Value			Value per Acre.		
		c.	q.	lb.	c.	q.	lb.	c.	q.	lb.	c.	q.	lb.	c.	q.	lb.	£	s.	d.	£	s.	d.
Autumn manured	Gritty soil	8	0	7	1	1	1	0	3	14	5	2	10	15	3	4	3	4	5	25	15	4
	Sandy loam	7	2	7	1	1	27	1	0	15	6	3	2	16	3	23	3	4	10½	25	19	0
Spring manured	Gritty soil	5	0	18	0	3	21	1	2	1	9	2	3	17	0	15	2	13	6½	21	8	4
	Sandy loam	4	1	7	0	2	16	1	0	8	11	2	14	17	2	17	2	9	1	19	12	8

The results of this experiment are much the same as in the former, proving that by spring manuring heavier crops of potatoes can be raised, but by autumn manuring the tubers are sounder. The produce was not sold immediately, but the rates at the time were L.6, L.4, L.3, and L.1, 10s. per ton, for the table, second, small, and diseased descriptions, respectively. The money results have been calculated by this scale. That spring-manuring predisposes to disease in the potato crop, or, at least, aggravates it when once it has set in, is quite evident from the above experiments, conducted, as they were, on quite different classes of soil.

The remainder of the land—the portions C, C—comprising two acres of each section, was sown with white globe turnips on the 4th of June, and although the weather was too cold to be promotive of vegetation in a wonderful degree, yet the young plants showed through the land in a short time, as moisture was abundant. That genus, *Haltica nemorum*, whose very name inspires terror in the breast of every turnip-grower, rather baffled the plants at first, but at length they got developed into rough leaf, and made a fair crop—certainly over an average of the neighbourhood in which they were grown. The singling was let at 1½d. per 100 yards, lineal measure, and the labourers performed their work very satisfactorily. In November the turnips were topped and tailed, and the produce of the portions shown on Diagram IV. weighed, with the annexed results:—

TABLE IX.

		Weight per Plot.			Weight per Acre.				Estimated Value per Acre		
		cwts	qrs	lbs.	tons	cwts	qrs.	lbs.	£	s.	d.
Autumn manured	Gritty soil, . .	32	2	4	13	0	1	4	10	16	11
	Sandy loam, . .	38	1	12	15	6	3	12	12	15	9
Spring manured	Gritty soil, . .	36	2	13	14	12	3	20	12	4	1
	Sandy loam, . .	40	3	12	16	6	3	12	13	12	5

It may be remarked that the results are here on the side of spring manuring. The occupier of the land, however, on which the experiment was conducted, who has long advocated and practised autumn manuring, asserts that had the crop been started with artificial manure, or, again, had it been Swedes, the results would, in all probability, have been in favour of autumn manuring. Swedes contain more roots than common turnips, which penetrate the soil in every direction in search of nourishment; hence it is that manure applied in autumn is more available for Swedes than the common or even hybrid descriptions of turnips.

After the green crops had been removed, the land was allowed to lie until March in the present year, when it was ploughed with a medium furrow in preparation for oats. On the 2nd of April it was sown with the Hopetoun variety, at the rate of four imperial bushels per acre. On the sharp gritty soil wireworm did much havoc early in the season, but the midsummer rains caused the plants to "gather up" very much, and the crop proved to be over an average. On the 25th of August one acre of each section was measured off, cut by means of the scythe, and, after standing in the stook for upwards of a fortnight, was carted to the barn, the remainder of the crop having been stacked. Of the two acres selected for experiment, one in each section was chosen from the middle of the field (see Diagram V.), embracing as nearly as possible an average of the crop, as well as affording an opportunity of testing the produce of both classes of soil. Table X. gives the results in corn :—

DIAGRAM V.

Autumn manured. Spring manured.

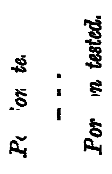


TABLE X.

-	Produce per Acre.		Weight per Bushel.	Seconds.		Value per Acre -			Value of Seconds.			Total Value.		
	bush.	pecks.	lbs.	bush.	pecks.	£	s.	d.	£	s.	d.	£	s.	d.
Autumn manured	43	2	42½	4	2	8	14	0	0	6	9	9	0	9
Spring manured	42	3	41	5	3	8	6	3	0	8	7½	8	14	10½

The quantity of dressed corn was less on the spring-manured land, the quality inferior, and the money value, of course, less. The produce of the autumn-manured land was worth 12s. per Carlisle bushel of three imperials; that of the other 11s. 8d. per three imperials. The seconds in both cases have been reckoned at 1s. 6d. per imperial bushel. Table XI. shows the amount and value of the straw:—

TABLE XI.

	Sheaves per Acre.	Weight of Straw.	Value at 4d. per Stone.
		st. lb.	£ s. d.
Autumn manured, .	688	166 4	2 15 5
Spring manured, .	700	168 0	2 16 0

A little more straw was produced on the spring-manured land, but the extra amount was inconsiderable. The total value of the white crop produce on the respective portions will be seen on reference to Table XII.:—

TABLE XII.

	Value of Grain per Acre.	Value of Straw per Acre.	Total Value per Acre.	Value per Five Acres.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Autumn manured .	9 0 9	2 15 5	11 16 2	59 0 10
Spring manured .	8 14 10½	2 16 0	11 10 10½	57 14 4½

The money value was in favour of autumn manuring, even in the oat crop, but this was not owing to larger bulk of produce—on the contrary, it was on account of superiority in point of quality. In Table XIII. will be seen the comparative results

TABLE XIII.

	First Year.			Second Year.		Two Years.
	Beans, One Acre.	Potatoes, Two Acres.	Turnips, Two Acres.	Oats, Five Acres.	Straw, Five Acres.	Total, Five Acres
	£ s. d.	£ s. d	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Autumn manured	10 15 2	51 14 4	23 12 8	45 3 9	13 17 1	145 3 0
Spring manured	9 7 3	41 1 0	25 16 6	43 14 4½	14 0 0	133 19 1½

of autumn and spring manuring, extending over a period of two years, and comprising a green crop and a white crop—that is to say, beans, potatoes, turnips, and oats.

The results of two full years' cropping were again in favour of autumn manuring, but as crops would naturally vary with climate, locality, weather, and so on, it may not be amiss to state briefly in conclusion under what circumstances each system is preferable. Autumn manuring may be successfully performed under the following conditions :—

1st, When farm-yard manure is used in conjunction with any of the portable manures, so that the crops may be carried on until the substances which have been incorporated with the soil become available for the food of plants.

2d, When a sound crop of potatoes is desired in preference to a large quantity. The quality of the tubers in this case is much better than when they are brought into close contact with the manure.

3d, From the fact that Swede turnips (being largely furnished with fibrous roots) are highly calculated to withdraw the manurial constituents from the soil, it is an exceedingly safe and excellent plan to manure in autumn.

4th, With respect to crops of all kinds which are abundantly supplied with roots, and therefore penetrate the soil in all directions, as in the case of wheat, oats, beans, and Swede turnips, autumn manuring seems to be the best system.

5th, In various sorts of root crops, as mangolds, carrots, parsnips, and the like, whose main roots have a tendency to branch off on touching hot manure applied in the drills, autumn manuring almost becomes a *sine quâ non*, if heavy crops consisting of finely-shaped roots be desired.

It is also often more convenient to cart the manure to fields in the autumn season, thus saving a serious amount of labour in the pressing months of spring.

Spring manuring is advantageous in the following cases :—

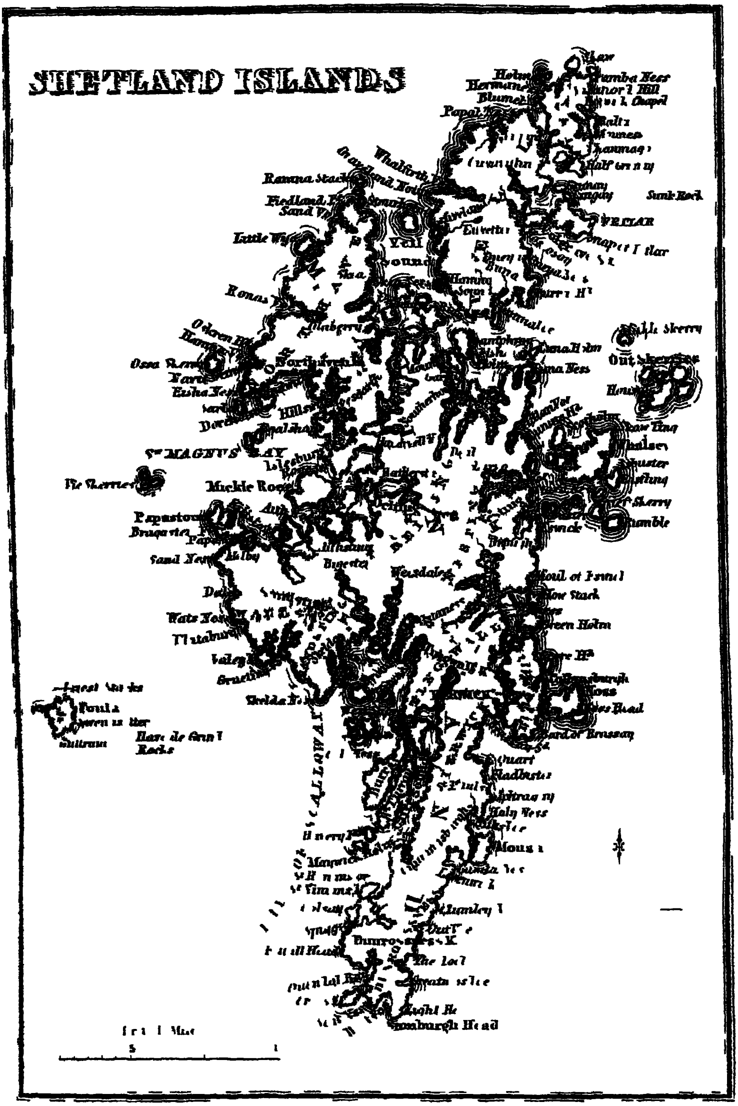
1st, Where the land is in poor heart, as the manure is then brought into close contact with the crops.

2d, For comparatively non-fibrous root crops, where artificial manure is not used.

3d, Where the soil is what is usually termed in local parlance of a " hungry " nature, as in the case of thin, sandy soils.

4th, Where a heavy bulk of straw is required in the growth of white crops.

It may also be remarked that, as a considerable portion of the manure used for the root and other crops is made during the winter months, it is, of course, impossible to dress the whole of the fallow-break in autumn, or even winter; it would therefore be wise economy for the community of agriculturists to prepare the land intended for such crops as receive the most benefit from manure when thoroughly incorporated with the soil in the autumn season as early after harvest as possible, leaving the remainder over until spring.


SHETLAND ISLANDS
Yell Sound
Yell
St. MAGNUS BAY
Mickle Roe
Papastour
Foula
Out Skerries
Whalsey
Weesdale
Sumburgh Head
Burrowaness
Mousa
Quarf
Fetlar
Unst
Haroldswick
Hermaness
Sand Ness
Ronas
Eshaness
Papa

[illegible]

ON THE AGRICULTURE OF THE ISLANDS OF SHETLAND.

By HENRY EVERSHED, Hellingly, Hawkhurst, Sussex.

[*Premium—Twenty Sovereigns.*]

THE regular passage of a line of powerful steamers between the Forth and Lerwick has entirely changed the agricultural position of Shetland, by opening up a good market for produce.* The cost of freight had been previously too great to be borne by ordinary farm stock, and such was the difficulty of navigation, and the liability to a long period of detention by adverse winds, that even lobsters, carefully stored in the wells of fast sailing packets, were exported with hazard. At the present time the cost of conveying lambs to Leith is 15d. per head. The scatholds of Shetland, therefore, have been united, in a sense, to the hills of Scotland, and the country has become accessible to the improved breeds of stock. Consequently all kinds of produce have greatly increased in value, and to mention some small commodities, which are largely exported, and may be taken, perhaps, as the units of value—eggs have risen from 1½d. per dozen, as a former price, to 7d. per dozen, as the present value. The usual price of a lamb of the native breed, in the early autumn, is about 5s., and the demand is very limited. The prices of half-bred lambs, sold in the country in August by a Scotch sheep farmer, were 34s. in 1872, and 30s. in 1873. The average fleece of a native ewe is less than 2 lbs. in weight; that of a blackfaced ewe, which thrives equally well with the original breed, on the same site, weighs about 5 lbs. These facts, in reference to a district which is not troubled by snow or by severe frost, and which is favourable to the growth and preservation of the turnip, and of forage grasses, will at once suggest that the opening of a market for Shetland, where none had existed till lately, must have raised the value of its feeding land, and added largely to its present and prospective resources. It is necessary to record that such striking economical changes have occasioned a certain amount of disturbance of the social elements. The advent of the sheep farmer has been unpopular with the fisherman-farmer, and although he has introduced an art which will undoubtedly prove a blessing to the islands, he has disturbed old systems,—as the Flemings did when they established the woollen manufacture in England,—and he has consequently been regarded with some suspicion.

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* The owners of the vessels which now ply between Leith and Lerwick twice a week, calling at Aberdeen, Wick, and Kirkwall, are the Aberdeen, Leith, and Clyde Shipping Company, who began in 1836 by running one vessel once a fortnight for three or four months in the summer. They obtained a contract soon afterwards for carrying the mail once a week by steamer, for six months in the year, and by sailing vessel during the remainder of the year. The latter seldom carried stock, and the steamers only carried ponies and cattle. It has been only within the last ten years that there has been any considerable export of sheep from Shetland.

It will be gathered from this introduction that the farming of Shetland is in a state of transition. It includes, at the present time, three varieties :—1st, That of the modern sheep farmer; 2nd, The old method of the fishermen-farmers, which unfortunately prevails over the greater portion of the land, and is the most primitive and unproductive example of husbandry that can be seen in Great Britain; 3rd, The improved cottar-farming, which includes the cultivation of rye-grass and turnips, and which is at present seen to most advantage in the island of Unst, where recent enclosures have rendered it practicable. The new system has awakened much interest throughout Shetland, as offering a possible means of increasing the produce and profit of the land by the agency of men instead of by that of sheep. I have therefore taken much pains to obtain, on the spot, an accurate account of the improvements which have been introduced into Unst. But before endeavouring to describe the details of farming it will be desirable to place before the reader the following statistics and general descriptions.

The population, which varies very slightly, and had diminished by 65 at the last census, compared with that of 1861, was in 1871—31,605. There were 18,525 females, and 13,080 males,—a disparity which is accounted for by the fact, that a seafaring life is, with emigration, the great resource of the surplus population. A large number of sailors in the merchant service visit home only occasionally. There were 5740 inhabited houses, and 6494 families, with 222 vacant houses, and 10 houses building. The number of occupiers of land who made returns in 1871 was 3992, occupying an average of 13 acres each. The total number of cultivated acres was 50,720, of which 11,626 were under corn crops; 3493 under green crops, including 2909 of potatoes; 522 under clover, and grass under rotation; and 33,227 in permanent pasture, or grass, exclusive of heath or mountain land—total area, 563,200 acres. The total number of horses, according to the returns, was, on the 25th of June, 1871—5354; of cattle, 21,725; of sheep, 86,834; and of pigs, 5251.

The gross rental is L.30,000, and the annual value, after deducting all burdens, including the expenditure on the poor (from 3s. to 4s. per pound rental), is L 21,000.

We read in the "Flora of Shetland," by Thomas Edmonston, that "the climate of these islands is by no means so severe as might be inferred from their northern latitude. The temperature, even in severe seasons, is seldom very low for any considerable length of time, and snow, generally speaking, does not lie long." In common with the whole of the western coast of Great Britain, the climate is equalised by the influence of the Gulf Stream. The most equable climate of all the stations of the Scottish Meteorological Society is that of Shetland, where the average temperature in August, the hottest month, is 54°, and that of February, the coldest month, is 38°; so that the range is only 16°. In Edinburgh the coldest and hottest months are December and July, and the means are 38·50°, and 59·31°. The temperature of the three winter months scarcely varies in any of the islands on the coast of Scotland, inclusive of the Shetlands, which lie 272 miles north-east of Edinburgh. Shetland, however, has five winter months—November, December, January, February, and March—with a mean temperature of 39·58°. But taking the range of the average temperature for the year, there is a difference of 6° between the warmest isothermal line in the United Kingdom, that of 52°, which passes through Cornwall, and the coldest, that of 46°, which passes from the Butt of Lewis through the Orkneys, nearly to Fair Isle, the most southern of the Shetland group. The mean annual temperature of Shetland is 45·5°; of Edinburgh, 47·31°; of England, 49·51°; and as a proof of the influence of the sea, it may be added that the mean of St Petersburg, in the same latitude as Shetland, is 40°. The plentiful growth in Shetland of the *Jesione montana*, which is scarcely found on the eastern, though common on the western coast of Scotland, indicates the singular mildness of the climate, as explained by the cause referred to, and by the fact that the prevailing winds are from the south and south-west. The influence of the protracted light of the northern summer day on the ripening of corn renders it proper to notice that night is almost unknown in Shetland during the months of June and July.

The drawbacks of the climate are the prevalence of moisture, and of fogs in winter, the rapid alternations of temperature—the daily range being 9·9°—and the shortness of the season during which tillage operations must be performed. The climate may be considered favourable for potatoes and many kinds of kitchen vegetables; but, owing to the lateness of the season, early cabbages and potatoes are seldom seen on the table before the end of July. Apples do not ripen, though a coarse kind is nursed in Shetland gardens. Corn is confined to the oat and the bere. Mr Shepherd saves his own yellow turnip seed in Whalsey. Mr Sandison obtains crops of perennial rye-grass from his home-grown seed in Unst, as good as those which he grew from imported seed. The average rainfall, as recorded in Mr G. J. Symons's "British Rainfall," was:—

	1850-9. Inches.	1860-5. Inches.
Sumburgh Head, Shetland, . .	36·14	36·79
Bressay Manse, „ . .	23·17	24·32

These figures may be compared with the following:—

	1850-9. Inches.	1860-5. Inches.
Haddington, ...	24·35	26·93
Cobbinshaw, Edinburgh, . .	35·65	35·65

According to another account the mean annual rainfall of Shetland is 31·50 inches, or intermediate between that of the eastern and western coasts of Scotland.

The following extract from the report of the Rev. James Robertson ("New Statistical Survey") will interest some readers:—"In a note taken at the Manse of Yell, December 24, 1832, occur the following remarks:—'The turnips are this day as green as they were at Michaelmas. The rye-grass among bere stubble measures from eight to ten inches of blade, and among the year-old rye-grass is the daisy everywhere seen in bloom.' To these general remarks, in reference to the mildness of Shetland winters, the history of those of 1835–6, 1836–7, and of 1837–8 forms a striking contrast.

"In each of the two first-mentioned winters there were three different falls of snow, the average duration of which was 11 days; while during the last-mentioned the snow which fell on the 6th of January had not entirely disappeared on the 1st of April. At no time, however, during this period was the thermometer observed to range lower than 11° below the freezing-point. Thus, 21° may be stated as the greatest degree of cold ever known in Yell, and 69° as the highest range ever attained by the thermometer in summer."

Thirty of the one hundred islands, rocks, and holms of the cluster of Shetland were recently reported as inhabited; but the number must at present be reduced in consequence of the dismantled state of a hut built upon a holm on the west coast of Unst, where, however, the advantages of the situation, including an unbroken view across the Atlantic, with grazing for a cow and half a dozen sheep, may soon tempt another tenant. A brief description of the surface of the country may properly precede an account of its agriculture. The reader will observe that there are more than fifty thousand acres of cultivated land, and about ten times that area of waste, and until lately each of the 13-acre farms—the average size of farms is 13 acres—had 130 acres of waste attached. This disproportion between cultivated and waste land is accounted for by the intractable character of the bare black hills which cover the interior of the islands, under the name of scathold. The cultivated land lies almost invariably on such sites around the bays and *voes* as were found by the early settlers to be sufficiently level for farming, and sufficiently near the sea for fishing. A Shetland village,* therefore, consists usually of a cluster of fishermen's houses, with their boats in front and their fields behind, the latter extending up the slope of the hill to the spot where the dyke was formed which separated the cultivated land from the scathold. This is generally the only fence in the village, except that which surrounds the *plantie cruive*, or cabbage seed-bed. Within the dyke are the plots of corn, from which cattle and pigs are restrained by their tethers, as well as the odd pieces of pasture on which they are pegged during a portion of the day. Beyond the dyke is the scathold or common, where every cottar has, or had till lately, an unrestricted right of pasturage. The exceptions to this general arrangement, which have arisen in recent years, will be noticed in connection with the improved sheep farming. It may be stated here that it is believed there is no spot of land in Shetland at a greater distance than two miles from the sea. That portion of Mainland lying between Lerwick and Sumburgh Head consists of a twenty-mile strip of hill, with the Atlantic and a bold cliff on one side, and the North Sea and occasional inlets and cultivated tracts on the other side. The northern part of Mainland extends to a width of 25 miles or more from the eastern to the western points, but the coast is so deeply indented with bays and pierced with voes, or narrow rocky inlets, that salt water is invariably found in every part of the interior within the distance previously mentioned; while in one spot, called the Mavis Grind (or gate), Mainland is nearly cut in two, being scarcely wider than a common road. The promontory of Sumburgh Head is also nearly isolated, the road at one part having scarcely any margin on either side between it and the water.

Peat prevails over a large part of the hills of Shetland, being invariably deepest where the underlying rock is least pervious; as in Yell, an island 20 miles long by 6 or 7 miles wide, whose substratum of gneiss is covered, to an average depth of no less than 3 feet,† with peat scored with watercourses, and dripping with moisture that is often heard, though unseen, in deep gullies under the surface.

Whalsey, an island 6 miles by 2 miles, supporting one sheep farm, is also almost entirely of gneiss, and covered with peat, except on the sea front, which is invariably free from peat in all the islands, so that a green band of pasturage, manured by sea-fowl and fish bones, surrounds each island, even when the soil is only skin-deep, and the grass is little better than a verdant clothing of the rock; gneiss also includes the scattered group called the Outskerries. The northern half of Mainland is of gneiss and quartz rock. A vein of limestone passing up the Tingwall valley divides Mainland into two sections, and the southern part, including a large portion of the western coast and of the "brown hills of Dunrossness," is of clay-slate and mica-slate, while the eastern coast, for a distance of 22 miles, is of old red sandstone and conglomerate.

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* Locally, a village is frequently called a town, as indeed is a single house, in accordance with the derivation of the word from *ton*, the homestead of a Gothic chief.

† New Statistical Account of Scotland, 1845.

In Unst, which is 11½ miles by 7 miles of extreme, or 3 miles of mean breadth, there are two distinct surfaces, one of which is covered by peat, while the other is bare, owing to the natural porosity of the rock. In passing up a central valley running northwards from Uyea Sound, the gneiss with its black carpet covers the ranges of hills on the left or western side, while on the right the hills are of serpentine and hornblend, and the soil consists of a mass of gravel, or debris of the serpentine, which is generally open and porous, and free from the iron pan below, which holds the water on all exhausted peat sites. The aspect of Unst on the road from Uyea Sound, northwards, is not inviting till the scene of the recent enclosures is reached at Mid-Parish. It is, however, the most improved of the islands, and its agricultural capability is generally superior, owing to the improvable character of the soil and the ease with which it may be worked. The burn of Balliasta, running down the central valley into the loch of Cliff, is the exact boundary of the strata. At the northern point of Unst the whole of Saxaforth hill is of gneiss, covered with deep moss. At Mouness a vein of diallage comes to the surface, and behind the house of Mr Edmondston, of Buness, are the chromate of iron beds which the proprietor has successfully worked. In Fetlar, 7 miles by 4 miles, once called the granary of Shetland, by virtue of its extent of comparatively level porous land, there is a similar division and distinction of surfaces, the serpentine being confined to the northern and eastern parts, while the rest of the island is of gneiss, diallage, and slate-rock bearing fuel. Bressay is nearly 6 miles long by 2 and 3 miles in breadth. It is of sandstone and conglomerate, as is the Holm of Noss, a little uninhabited island of one mile by half a mile, separated from the perpendicular cliffs of the east of Bressay by a narrow channel, which was formerly crossed by a bridge of ropes, with a cradle for passengers, one of the curiosities of the high cliffs of Shetland. Since the improvement of Major Cameron's estate, Bressay has become an important agricultural island. The island of Mousa, now uninhabited and scarcely worth notice in an agricultural report, though it is one of the seven largest islands, is also of old red sandstone and conglomerate. The agricultural superiority of limestone over all the other formations is seen wherever it comes to the surface, as in the long narrow promontory or tongue of land on the western side of Mainland, called White Ness, which is a beautiful green strip, covered with cottar farms, and divided by narrow voes from strips similar in conformation, but barren and unpopulated, owing to the poverty of the soil. The strip of limestone, extending nine miles from Scalloway, through the valley of Tingwall, to Catfirth Voe, is of exceptional value, as are the limestone pastures at Cliff in Unst, and on the Outskerries. It must be borne in mind, however, that whatever the soil of the scathold may be, the growth of trees and shrubs is prevented by the browsing of cattle, and its exposure to strong winds charged with saline particles. The usual covering of the hills consists of stunted heather, with rough grasses, sedges, rushes, and moss, and occasional patches of the blaeberry (*Vaccinium Myrtillus*) and cranberry. As the fir fringes the coast of Norway, it has been argued that it might cover the hills of Shetland, if planted in large quantities, well nursed, and raised from seed selected in northern districts. The discovery of boles of timber in some of the peats apparently supported this view. But possibly the prehistoric woods of Shetland flourished before it had been torn by the waves into such island shreds and tatters as it exhibits at present, and before the brine-blast was enabled to attack its vegetation from all quarters of the compass, within, perhaps, a period of a few hours. It can hardly be anticipated by those who have examined the evidence on this subject, which is naturally one of very great local interest, that timber trees of large size can be produced under such unfavourable circumstances; but, on the other hand, it cannot be doubted that something very different from, and much more agreeable than the utter barrenness of the country in regard to trees, might be attained if proprietors would take the necessary pains. In proof of this, I may mention two small plantations of trees at the residences of Mr George R. Tait and of Mr Joseph Leask, in sheltered situations near Lerwick. They were planted by Dr Arthur Edmondston, who received a premium (a handsome silver salver), adjudged by the Highland Society of Scotland in 1824, "for having planted the greatest number of trees on the largest extent of ground, between 1st February 1822 and 1st November 1824, of any proprietor or tenant in Zetland." These plantations are chiefly of sycamore, which appears to me to be the most successful and showy tree growing in these northern islands, where, however, it is seldom seen, and only seen in gardens and small enclosures, as at Land House, and at Busta on the Mainland, where the late Mr Gifford left at his death a thriving plantation. Mr Thomas Edmonston of Buness, who possesses the salver adjudged to his uncle, informs me that his own place is too near the sea and too exposed for tree culture, but Dr Samuel Edmonston has practised arboriculture in Unst, on about one acre of ground, which is unfortunately only a few hundred yards from Balta Sound, and much exposed to salt spray, as well as to the severe and damaging blasts from the hills. The exposure, moreover, is easterly, and the soil resting on serpentine, is thin, with a cold subsoil; but with all these drawbacks, some of the trees have overtopped the high enclosure many feet, and they measure no less than three feet in circumference immediately above the ground. Most evergreens are unsuited to the climate of Unst, and neither the oak, hazel, nor Spanish chestnut will grow. Dr Edmonston has succeeded best with the sycamore, mountain ash, elm, ash, Norway maple, laburnum, mountain pine, Norway spruce, birch, and elder. The hazel, which failed at Balta Sound, is one of the indigenous plants of Shetland, and is found growing with the mountain ash, honeysuckle, briar, and willow, on several of the islets, and holms in the fresh water lakes, secure from injury by live stock. But in spite of these collected examples, Shetland wears the aspect of a perfectly naked district, since its trees are only found in a few gardens and sheltered enclosures and islets, and are shrub-like in size, even in the case of the two trees which grew some years ago in the garden of the minister of Sandsting, a mountain ash and an elder, each of which was graced with a crow's nest. Even hedges of elder, which is the hardiest shelter shrub in Britain, for exposed situations, must be carefully nursed in their early growth. The elder forms the only living shelter fence in Shetland, with one or two exceptions; and even the elder is rarely seen, and is liable to be destroyed at the top, in all exposed situations, as soon as it looks over its protecting wall.

It was justly remarked by Mr John Shirreff, in his "Agriculture of Shetland," that the scathold, or hill pasture, is the most valuable part of the Shetland islands. But this is only in consequence of their extent, since the best authorities estimate the hills of the southern half of Mainland, barren, stone-strewed, and often bare even of heather as they are, at from 6d. to 1s. an acre in different parts. The northern portion of Mainland being better clothed with heather, is worth, in many instances, twice as much. The quality of the rock below determines the value of the herbage, and the covering betrays to a practised eye the character of the rock. There are four or five distinct surfaces in Shetland, but the general covering is of peat, which prevails over much the larger portion of the county.

The agricultural condition of Shetland may be conveniently examined under the following heads:—

1. *The Ancient System of Farming and Native Breeds of Animals.*
2. *Sheep Farming and Large Farming.*
3. *General Improvements; Modern Cottar Farming and the Truck System.*

1. *Ancient System of Farming and Native Breeds of Animals.*

In order to make the details of cottar farming and the agricultural position of the cottars intelligible, I propose, in this section, to offer a brief general statement, and then to describe the succession of crops, the modes of cultivating the land, and the management of manure. The peculiar agriculture practised by the fishermen-farmers is explained by their exceptional position and habits; and as the agricultural and social economy of Shetland are singularly blended and unique in character, it seems necessary to glance at the circumstances of the country, and to make a few references to the position and peculiarities of the people—references which will be brief and purely illustrative of my subject. And since the various novel customs of the country would require a volume to describe them minutely, I may mention that Shetland and the Shetlanders have formed the subject of a long catalogue of works, the most complete of which is Dr Samuel Hibbert's "Description of the Shetland Islands," which, though it was published in 1822, is by no means obsolete. An excellent and more accessible modern work is Dr Robert Cowie's "Shetland," 1871. Mr J. T. Reid's "Art Rambles in Shetland," 1869, and Mr James Wilson's "Voyage Round the Coast of Scotland," 1842, both contain original observations and descriptions of interest. But the most complete repository of information on Shetland is found in the "New Statistical Account of Scotland," vol. xv. 1845.

The cottar picks up his living partly on his cultivated land, partly on the sea, which is usually his boundary in one direction, and partly on the hill, which bounds his land on the opposite side. He obtains from them three essentials to his existence—from one of them bere and oats for bread, from another fish-oil for light, and from the hill peat for fuel. With the exception of tea and sugar and a few small articles, he buys nothing for consumption, and lives entirely on the produce of his own industry, including fresh and dried fish, milk, pork, meal, and occasionally lean lambs caught and killed from his flock on the scathold. Fishermen-farmers transact all their affairs with the use of a very small quantity of coin. As a rule they neither buy nor sell anything but trifling necessaries. As one of them remarked to me, "Everything with us gravitates to the shop." A system of barter commenced in the stores and booths of the Dutch merchants when the fishing trade was in their hands; and when the landed proprietors of Shetland, with very laudable enterprise, ousted the Dutch merchants at the commencement of the last century, the same practice of barter was continued, till it ended, through the poverty and dependence of the fishermen, in truck,—a system implying a servile tenure, which is greatly to be deplored, and introducing relations between landlord and tenant which every one condemns in theory, while the remedy seems as difficult as the evil is apparent. The boat's crews, as a rule, are provided with tackle by their landlord, or by the tacksman who farms the rents, and, in accordance with their contract, they are bound to carry the surplus produce both of farm and fishery to the "shop." A running account, which is usually settled yearly, is kept with each tenant, who is credited with the value of the commodities, which, if he were a free agent, he might have sold in the open market, provided he could have found a market in his isolated locality, and who is debited with such items as rent, cost of tackle, &c. The results of this system have been the multiplication of small holders, the general reliance upon the industry of the sea rather than upon that of the farm, the substitution of the spade for the plough, and, to use a familiar term, a gradual "letting down" of the farming. While all other districts have been advancing, Shetland has remained stationary, if it has not retrograded.

Briefly offering evidence of the above remarks, I may say that in 1797 there were fourteen ancient Shetland ploughs in the parishes of Sandsting, and in 1840 not one, and only three ploughs of any kind,—one on the glebe drawn by two oxen, one at Reawick, and one in the island of Papa-Little, drawn by four ponies.* The farms had been much reduced in size in 1840. In 1814, when Mr John Shirreff's account of the "Agriculture of the Shetland Islands" was written for the Board of Agriculture, the population did not exceed 23,000, and the area of cultivated land was only 25,000 acres. There were obvious motives for proprietors and tacksmen increasing the number of tenants in the neighbourhood of the prolific harvests of Shetland waters. The means by which the movement has been effected, have been the division of the farms and the enclosure of the most available portions of the common pasture, upon which young men, wishing to settle, selected patches of ground, on which they built their homesteads and dykes, and were allowed to sit rent free for seven or nine years, after which they became the rent-paying tenants of the principal proprietor of the nearest arable land. Or the landlord erected the buildings and dykes, and charged rent from the time of entry. The breaking up of new land and the planting of "offsets" has been continuous, and notwithstanding the recent depopulation of certain districts in the formation of sheep farms, the population of the county has been maintained without the opening up of new industries.

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* Report in New Statistical Account of Scotland. By the Rev. John Bryden, minister.

In a district which lies in an inconvenient position for fishing, and where there are still a few farmers left who are disconnected with the sea, some of the best land proves so unproductive, under the ancient system, that the tenants are only getting a poor living, while paying only from 10s. to 15s. an acre for their cultivated farms of 20 or 25 acres, with 200 acres of enclosed scathold, worth 1s. an acre, divided among nine tenants. The average extent of cultivated land, according to the statistics, is 13 acres, but the usual size of a cottar farm frequently does not exceed half that area within the dyke. A common rough reckoning is that a tenant should pay for land, house, byre, and barn, L.1 per cow, and supposing he has six or seven acres of cultivated land and unstinted scathold, he ought to keep four or five cows, milking and dry.

It is seldom even on the best land that the rent is so much as L.1 per acre.*

It is evident that the tools and dead stock of these small farms must be of a humble and inexpensive kind, that the buildings must be small and the general outlay minute. Everything is, in fact, home made and rude in construction. The mills are peculiarly characteristic, and are unaltered since the period when Triptolemus Yellowley described a Zetland mill as "just one degree better than a hand-quern—it has neither wheel nor trindle, neither cog nor happer, it canna grind a bickerfu' of meal in a quarter of an hour, and that will be more like a mash for horse than a meltith for man's use." In the united parishes of Sandsting and Aisthsting, with a population of 2000, and an area ten miles long by eight miles in breadth, Mr Bryden reported, in 1840, "fifty mills driven by water, and querns or hand-mills without number." The same relative number of water-mills, with querns innumerable, prevails at the present time. There are burns in every township, and a mill to every half dozen families. The volume of water is, of course, in proportion to the small distance the burn runs before finding the sea, and the size of the vertical water-wheel is adapted to that of the rivulet. The mill is built, like all other structures, of stones or turf, the only abundant and ever-present materials of construction. Like the houses, and all other buildings, it is thatched with feals, or strips of turf, weighted with stones for security against storms. No portion of the materials is purchased, except a single clamp of iron, which is fixed in the running stone. Five or six families co-operate in the building of a mill, and they may become its owners a few days after the foundation-stone has been laid. Their wives, when they wish to grind a peck of corn, turn the rill against the wheel, and sit by the stone with a peat or two burning on the floor, and tea in preparation, perhaps, till the rough process is completed. After grinding the grain the husk is sifted out of the meal by hand. Previous to grinding corn it is dried in a kiln (built into the family barn), well trodden in a basket while still warm, and then winnowed between two doors. The Shetlander and his family are invariably their own handcraftmen, making and mending their own clothes, keeping their own premises in repair, and in many cases erecting all the buildings which comprise their little homesteads, including the dwelling, byre, and barn, all built with earthen floors, with narrow slits for admitting light to the houses, closed with bladders or lambs' skins more often than with glass.

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* *I.e.*, per imperial acre, as always in this Report.

Spinning and knitting articles of hosiery are among the occupations of the women. The fine wool of the native breed of sheep is spun in its grease as taken from the animal's back, and is knitted into stockings and shawls and comforters, for sale and family use, and woven into blankets and tweeds, which are made into clothes for the family. The crofters sometimes sell butter, but as they buy no animal food, a large family requires all the produce of the farm, and milk is a constant and important article of diet; in bad seasons they are buyers of bere and oatmeal. Large families, except on the best crofts, are always buyers.

Tea is the only indulgence which the Shetlander is said to use immoderately. He is almost a total abstainer from spirituous liquors of any kind, which, in fact, seldom come near him. Frugality is among the virtues which make him a successful emigrant. His training from a child, when he begins to wield a sillock rod in the nearest voe, makes him a sailor, and his elementary education at the village schools colours and aids his whole life. It assists him, if he is persevering, to master sufficient knowledge of navigation to obtain a Board of Trade certificate, and to rise, as he often does, to the position of a ship's officer; it assists him in those fields, outside Shetland, in which his ambition is usually exercised; and if he remains at home, and goes to the fishing and becomes a farmer, it enables him to communicate with his brothers, uncles, or sons, in the colonies, and to read the well-thumbed works of travel, history, and religion, which are found in his capacious sea chest; it will enable him to read this Report, if it should reach him, as I hope it may, if it contain anything that may be useful to him. But, while I acknowledge his many virtues, his sobriety, his hospitality, his desire "to get education," and his skill and courage on the sea, I must confess with much regret, that the cottar farmer, though he may challenge any on our coasts as a fisherman and boatman, is without a rival in the badness of his farming. A crofter's farm in summer is frequently a curious collection of irregular plots of corn divided and bordered by strips and bits of pasture. In certain districts which happen to be stony, boulders lie in the corn, with fringes of docks and thistles and other weeds surrounding them, as if weeds were inevitable, and stones were sacred, as certain great stones were held to be in these islands among our Pagan predecessors. Docks are excused on the ground that useful baskets are made of them. Wet strong spots are often laid partly dry by gathering the earth from a wide surface into beds with small ditches or grips, and rows of weeds between. On such spots the plots are of all sizes and shapes. These are some of the details of management:—

Succession of Crops—1. Fallow, commonly called "ley;" 2. Oats; 3. Oats; 4. Potatoes and patches of turnips and cabbages; 5. Oats. Or, 1. Fallow (ley); 2. Bere or oats; 3. Potatoes; 4. Bere. Or, on poor land, 1. Fallow (ley); 2. Oats; 3. Potatoes; 4. Oats.

The series of crops is, however, extremely irregular, and the principle of management too often is, the growth of corn, year after year, until the land is exhausted. The old world distinction of "outfield" and "infield" still exists in name and practice. The poor land called "outfield" is sometimes managed by turning it over and sowing a crop of black oats in alternate years, leaving it to nature when it is not in crop. Outfield is the inferior land which is considered too poor to produce bere. The infield is the better land sometimes called bere-land, and occasionally laboured and manured for that crop year after year for a generation. In this case the land is always manured every year with byre manure made in the manner described presently The fallow or "ley," which stands at the head of the above series, is a fallow that fouls instead of cleaning the land, and a "ley" that yields neither forage nor fodder. The ley is left to nature, without being laboured for seventeen or eighteen months. For example, a plot which yields bere in 1873 would be left untilled during 1874, and would be allowed during the summer of that year to produce a gay crop of seed-producing weeds. Even if the fisherman-farmer made plenty of good manure,—and as he scarcely grows any roots except potatoes, he can only make a very little,—this single blunder of allowing the land to lie for a year or more, producing weeds at the commencement of the succession of crops, would ruin his farming. The cattle, which are tethered among the weeds during summer, undoubtedly get a certain quantity of rubbish to eat; but it is poor economy to leave the land to its wild productions—rag-weed, may-weed, the ox eye, and other rubbish, such as only starved animals will eat—when only seed and labour are required for the production of cleansing and nutritious grasses and turnips. In consequence of this system, the growing corn has to struggle with weeds to an extent that none would imagine who had not seen what the crofter calls his corn crops, bright with gay blossoms, in July and August, and yielding, as might be expected, always less than eight sacks of oats per acre, and frequently less than five or six sacks, when they ought to yield and would yield, if properly cultivated, nine or ten sacks per acre at least. The mischief does not stop with the loss of the ground for a year. The beginning being bad, the end is still worse.

Potatoes, of varieties varying in colour,—light-red, dark-red, streaked, and white,—are only manured when they are grown in the poorest outfield. They are the cleansing crop of the series. The time of sowing or planting all crops in this climate is the time of digging up the stubble in spring. The potatoes are either covered, at narrow intervals, in digging the ground, or are dibbled. At the appearance of the shoot, the operation of "shovelling" the potatoes is performed by turning up the weeds with hoe or spade, and giving them a stroke with the harrow,—an implement drawn by women and boys, and sometimes by a pony, and constructed of two bars, 3 feet long, each armed with eight or nine teeth, and tied by cross bars 18 inches long. "Choking," or laying the earth to the drills (moulding), completes the cultivation until the time of lifting the crop in September. The land is then allowed to remain in a rough state until spring, when it is manured, dug, and sown with corn. About a fourth of the arable land is usually covered by green crops, including, perhaps, 30 rods of turnips for the family and the cattle, and a rather larger plot of cabbages, of a hardy kind, sown in July in the enclosed seed bed, called a plantie cruive, transplanted in April, and coming to perfection in November.

Bere.—The four-rowed kind, and the six-sided with a shorter head, are the sorts in use. This is regarded as the most important corn crop, being sown on the best land, with a lion's share of the manure, which is usually delved under before the crop is sown.

When oats get manure the seed is usually harrowed in with the manure. Seed is scattered at the *voar* or seed time by hand, on the same day, if possible, that the ground is dug. Manure is sown broadcast, if sufficiently short, and is covered by the harrows, to which one of the labourers yokes herself or himself. It frequently happens that a family are as innocent of the possession of a harrow as of a plough or cart, in which case they sweep the field with a heather broom. The potato oat, which is invariably preferred by improvers, appears to require better cultivation than it would receive at the hands of average fishermen-farmers, who still hold by the bristle-pointed or grey bearded oat, the old Scotch flaver and original oat of Scotland (*Avena strigosa*).

With regard to the yield of crops, it is extremely various.

Even those who are most diligent in keeping the land clean and in the laborious task of collecting earth on the hill, do not often obtain a crop of bere exceeding four quarters per acre.

Manure.—It is evident from the above that the manure-making crops are confined to the straw of the corn, the patches of turnips and cabbages grown in the potato shift, and the small quantity of hay which some cottars grow within the dyke. The other manures are sea-weed, the offal of fish, and "truck manure," or earth taken from the scathold—a privilege connected with the scatholds which their increased value, as sheep runs, has induced landlords, in many instances, to curtail. As there are no farm buildings or yards, except the little home-built byres, manure is made entirely in these buildings during the winter, and as earth is an excellent deodoriser, the method of bedding the cattle with it would be excellent, if the hills were not spoiled by the removal of the surface. The process referred to is as follows:—Spits of earth and turf, dry and broken small, are laid over the whole of the floor of the byre as a bedding for the cattle and to absorb the manure, which is evenly spread every few days, with the addition of some fresh mould and turf so as to keep a dry bed, until the byre is full, and the cattle have barely room to stand under the roof. The excellent manure made in this manner is applied to the best arable land for bere, grown on the *infield*, and the weaker manure, which is put out when the byre is full and mixed also with earth, is applied to the *outfield*. Manure, therefore, accumulates during six or seven months, in and around the little homesteads, and is then taken to the land in March and April. The bones and offal of the fisheries are not collected with the care they deserve. When they are not wasted, these substances are mixed with light earth and heaped until they are partially decayed. If fish offal, dried by exposure on the beach, were collected at the various fish-curing establishments, it might be conveyed to convenient sites for grinding it into powder, in which state it is a powerful manure,* rich in phosphate of lime, and especially valuable for turnips. In Mr R. Scot Skirving's trials with Norwegian fish offal, the heads, bones, and skins, dried in the sun and ground by machinery, were applied, in the state of fine powder, to turnips, with the following result:—6½ cwts. of "offal," costing L.2, 17s., gave 17 tons 14 cwts. of turnips per imperial acre; a dressing of guano, costing L.3, 11s. 9d., gave only 16 tons 12 cwts. of turnips.

Sea-weed, though not generally cast on the steep beaches of these islands in very great abundance, is an important manure, and particularly so in favourable districts and in certain seasons. It is used alone, both as a top dressing for grass, and on arable land, after being collected in early spring and rotted in heaps for about three months, or it is mixed, in a compost, with cow dung and earth, and applied to the corn crops. Sea-weed would probably be used more largely if the means of carrying it were not confined to the *cassies*, hung across the ponies' backs.

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* See Mr R. Scot Skirving on Fish Offal; Transactions, vol. xix. Third Series, p. 23.

The subject of manures may be concluded with the remark, that the crofters do not, at present, set any value upon human excreta, which are used by the peasantry of the south to enrich their gardens. Their dwellings are invariably without the accommodation of a privy, although more labour is expended every year in the collection of truck manure, than would be required to gather together a few stones for the erection of the necessary building.

The old wooden plough of Shetland, with its single stilt, closely resembles the most primitive farms of the ancient plough. It is carried into the field on the farmer's back, and is drawn by ponies or oxen; but there are few cottar farmers now who possess a plough. The spade is a tool with a handle four feet long, shod with an iron blade, above which is a stilt of wood on which the foot is pressed in driving the blade into the earth. The men, women, boys, and girls of the family use this tool in parties, and it is possible to make good work with it, by turning the top spit forward and then stirring the under spit, which has been laid bare by the removal of the top; but it is very easy, with such a tool, to change the operation of digging into a mere scratching of the surface. The scythe and sickle are as peculiar and diminutive as the other tools. The former has a blade only 14 inches or 15 inches long, with a straight haft, and a single handle which is grasped with the left hand, the mower working in an upright position.

The inside measurement of the stone and turf built cottages, which are all erected on a similar plan, is 28 feet by 12 feet. There are two compartments, the but and ben, containing respectively the box-beds for sleeping, and the peat fire, with convenient sea chests, benches, and more plain furniture than the exterior of the house promises. On improved estates there are chimneys; but holes in the roof, protected by a skyle, which is moved by a pole from the inside when the wind shifts, are more common, as yet, than chimneys. The domestic animals, such as *caddy*, or coset lambs, cats, calves, and dogs—the nuisance and necessity of the scathold—are more numerous in the *but* than is desirable, considering that cows are kept, and that the kitchen is also the dairy. These details are given because they bear directly on the question of the money returns from the farms, which would be improved if good butter, saleable at Lerwick or elsewhere, could be made under the circumstances just noticed. There is an obsolete Act of the county to the effect, "That no butter be rendered for payment of land-rent, or for sale, but such as is clean from hairs and claud, and other dirt." But when dwellings are heaped together like swallows' nests, entered often through the byres, crowded and blackened within by peat smoke, and surrounded by dunghills,—all of which conditions exist in many townships, and some of them in all without exception,—it is useless to endeavour to enforce cleanliness by law. Minute details of the dairy need not be given. The common butter has only a local sale, and is worth about half as much as butter made on the same land under more favourable circumstances. The acid beverage called bland is made by pouring boiling water into butter-milk after very imperfect churning. The milk is never skimmed, and it is churned every day when the quantity is sufficient. The white and yellow streaked butter is hastened by dropping a hot stone into the churn at a certain stage of the process.

Fuel.—The shelties are the carriers of peat by means of the wooden klibbar, on which are hung the cassies filled with peat. When the hill whence the peat is brought happens to be distant, a cottar is compelled to keep as many as four or five ponies, since all the fuel that will be required from July till the following summer to dry the corn, warm the house, bake the bannocks, cook the fish and potatoes, and *boil* the tea, must be brought home in peat harvest. In cutting the peat, which is done after the spring seeding, the moss (feal) is pared off, and the peats are cast with the tasker and laid to dry. In two or three weeks they are set up on end; and they are stacked after midsummer, when the whole of the female and juvenile population goes to the hills to load the ponies, and when human peat carriers (generally woman knitting as they bend under their cassies) are met in troops, especially around Lerwick and Scalloway. When peat has been once well dried it never becomes too wet in the stack for burning.

The exigencies of the peat harvest led to the introduction of carts into the level part of Dunrossness, on the estate of Mr John Bruce, jun., who imported small carts adapted to the rather large ponies of that superior district, and induced his tenants to try them by means of a harmless stratagem. Carts had never been seen in that part of the country before, and were the cause of some amusement, till a cottar was prevailed on to borrow a cart in peat harvest. It proved useful; and when the proprietor suddenly required the cart, putting a price on it at the same time, his tenant purchased it, having discovered that it held more than two cassies, and that a pony can draw, on wheels, much more than he can carry, the backbone of the animal being horizontal, and therefore liable to be broken when overweighted, even when it has a short back and a big body for its size, like the sheltie. The same district which has made this advance competed, in 1818, for a premium offered by the Agricultural Society of Shetland as a reward for sowing turnips. It was the only district that had turnips to show, and its largest plot was a quarter of an acre.

The management of live stock under the old system of unstinted common pasture is a matter of curiosity which must be treated briefly. Shetland animals, like the people, are Norse in blood. The ponies are the same breed as those of Norway and Sweden, and according to Professor Low,* the only mixture of blood has been by Spanish horses left on the shores of Shetland on the stranding of some of the ships of the Spanish Armada. Professor Low attributes to this accidental importation some portion of the neatness of form and the speed which characterise the shelties, and also the prevalence of brown and bay colours, as in the horses of the south of Europe. An extremely hard life, especially in winter, has diminished the original size of the ponies, and the same circumstances have given them a felted coat of long hair, which gradually peels off in spring, the last tatters hanging about them till late in the summer.

The ponies seem to have been made for the country, or perhaps it is more correct to say that the country and treatment have made them what they are—the smallest, the hardiest, and, comparatively, the strongest of ponies. Other qualities are induced in them by the constant handling of their numerous grooms, including all the children of the family, and they are, as a rule, as gentle and tractable as the horses of Bedouins, and on that account they are easily trained for the circus. They invariably have diminutive, bright-looking faces, and are remarkably sure-footed and clever in coming down the steep hill sides when loaded with peat, earth, stones, provisions, or anything else that it may be necessary to transport in a hilly country, where carts are seldom seen. They are broad-backed, weight carriers by make and habit, and are often met walking along the roads—trotting is not attempted under such circumstances—carrying a stout man who, with his dreadnought, occupies all the space from shoulder to tail, and has to lift his feet when he sees boulders in the road.

Every cottar keeps a pony, and those who are distant from the peats, or situated in the northern parishes of Mainland, where the scatholds are well provided with heather for winter food and shelter, may keep five or six, selling the progeny at two or three years old, when the mares are worth from L 3 to L 7, while geldings are worth nearly twice as much in consequence of the demand for the coal mines in the north of England, where the little animals are employed to draw trucks in the drifts and tramways. The prices just quoted indicate that the animals vary greatly in value. Some of them are very inferior, and their crooked legs and narrow low backs bear evidence of the careless breeding which has produced these bad points. The usual heights are nine and a half or ten hands of four inches, and the extremes are seven and a half hands, and twelve hands. Black, and more rarely piebald, are occasional colours. Peculiar and extremely useful qualities having been stamped on the Shetland pony by the circumstances to which he is exposed, it becomes a question to what extent he might be improved, without becoming unfitted for the business of carrying loads in neighbourhoods which are too steep for carts. The best authorities regard selection, rather than crossing, as the true means of improvement; persons who wish for more size recommend a cross with the Orkney breed, while others recommend the Arab thoroughbred in order to obtain speed and style. Some years ago the late Sir A. Nicholson introduced this method of improvement into Fetlar, but the animal thus produced is, so far as the general wants of the island are concerned, inferior to the native breed. The other proposed cross has not been successful, and I do not think that any experienced breeder would look for improvement from a breed which is not superior to that of Shetland except in size, and which is far more mixed in its descent. In order to improve the Shetland ponies generally, and to preserve the qualities which give them their value, nothing is needed but care, and the selection of the best animals for breeding purposes.

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* "Domestic Animals," vol. i. p. 31.

Similar circumstances have stunted the cattle, which are considerably smaller than the ancestral stock of Norway. Since the most northerly and the most southerly islands of Britain derived their breed of cattle, according to the best authorities, from the same original Norwegian stock, it might be expected that they would possess some points in common. Accordingly we find a peculiarly soft skin both in Alderney and Shetland cattle. Professor Low, who is usually so accurate, mentions some other qualities which were attributed both to the Channel Islands and to the Shetland breed, including a good milking disposition and precocity, with an early old age. He had been informed, but certainly not correctly, that the last-named breed receive the male as early as five or six months; but the truth is, a pure cow, reared by a cottar, is quite immature at three years old, and does not attain its full growth till the age of five years, seldom accepting the bull until between three and four years old. As to milking qualities, a cottar usually milks his cows six months, and allows them to be dry six months; and the yield is generally very small, although the best cows are good milkers for their size. From five to eight quarts a day is not an uncommon yield for a good cow, and ten quarts in extraordinary cases, but in many cases the yield does not exceed two or three quarts a day for a cow in profit. The cause of this extreme variation and of this general bad return is the want of resources, and the habit of letting everything *drift* without interference. Cottars never think of parting with an indifferent cow, and they pay no attention to the selection of good milkers. They look upon the possession of an indifferent cow as a misfortune for which there is no remedy, and they submit as patiently as in the case of a bad day's fishing. The old cows when fatted weigh from two cwts. to two and a half cwts.; the oxen two or three cwts. The first cross between the shorthorn bull and the island cow weighs at least twice as much, and, owing perhaps to the purity and long descent of the little cows, the cross closely resembles the mother in general appearance. A good cross-bred cow yields from ten to fourteen quarts a day, in comparison with the examples already quoted. The Shetland breed is entirely unsuited for improved farming, and whatever general improvement might be effected by selection, the animal itself has only one merit, that of hardihood and capability to submit to improper treatment, and it will not, under any circumstances, pay for artificial feeding. The experiment of liberal treatment in rearing the young animals always fails, so far as profit is concerned, for want of inherent capability of growth in the breed. When the produce of shorthorn bulls and Shetland cows is brought up in company, the remarkable effects of the cross are placed in a very striking point of view; and the difference between yearlings running in the same pasture and brought up together is, that at a period when the pure bred calves still threaten to remain calves for a long time, the others are already young beasts promising to grow soon into bullocks. An owner trying experiments with an unsatisfactory result, and pointing to his Shetland stock, remarked to me, "That is all you can make of them; they won't grow out!" A good cow, calving at nearly four years old, is worth L.5 or L.6, if promising; a good cow with her second calf (unborn) is worth L.7 or L.8. They are reared on the scathold, with some slight aid, by hay in winter, and they do not pay for better food than the common diet of the country. I have known them highly fed, experimentally, with very little effect on their growth. Nor will winter feeding on turnips, nor any kind of forcing, bring them to early maturity.

The Sheep of Shetland is the short-tailed variety of northern Europe, approximating more closely than any other breed to the Argali, or wild sheep of Siberia. According to Mr Shirreff, these sheep of the scathold are similar to the breed that overran the Highlands of Scotland within the past hundred years. They have, however, been intermixed with Dutch sheep during the time when the Shetland fishing trade was in the hands of the Dutch merchants, and they have also been modified and debased by rough living and by such maltreatment as ought to be placed on record as matter of historical curiosity, showing the evils of the system of commonalty, and also how worthless a breed may become by neglect. The circumstances referred to are briefly the promiscuous intercourse which occurs on the scathold, the non-castration of the inferior lambs, the fact that about one-third of the ewes have a lamb at a year old, and that the best lambs, as in the case of all other stock, are frequently sold or killed owing to their greater value, while the worst are kept for breeding purposes. The natural wildness of these sheep is increased by the practice of running them down with dogs, like game—a barbarity which has greatly increased the instinctive dread of those animals, which seems natural to all sheep. These hints may suffice to show what may be expected economically in animals which are, so to speak, the offspring of the scathold. There can hardly be a more picturesque creature of the kind than the Shetland sheep, of several colours, dun, black, brown, white, and mixed. In the absence of the hare, which does not live on the scathold, there could not be a substitute of wilder aspect and of more game-like appearance. Confining myself to the agricultural qualities of this straight-horned and goat-like breed, the fleece consists of wool and hair mixed, and as the former parts from the skin naturally in summer, leaving the hair behind, as in the case of wild breeds, the fleece is always removed with the fingers. Its weight does not exceed 2 lbs. Its softness and fineness, and the primitive industry of the Shetland wives in connection with their famous hosiery, need not be enlarged on. Mutton is the only fresh meat accessible to cottars, with the exception of pork, and their practice is to kill the spare lambs for home consumption during summer and autumn. When the number is large, and the district is within reach of Lerwick, some of the lambs are sold in the town. They are caught in a lean condition, and are not esteemed by those who can afford imported mutton. The price is 4s. or 5s. each, and the weight about nine pounds.

Occasionally 100 or 200 ewes are kept by successful cottars, when the scathold has not been divided; and in one case, in the parish of Delting, a single farmer owns more than 600 ewes, and sells eight cwts. of native wool yearly. A flock of thirty or forty ewes is kept under ordinary circumstances, but sometimes the flock does not exceed three or four ewes, and in such cases it is occasionally brought within the dyke, and each animal is shackled by loosely tying a fore and hind leg together. The ewes begin to drop their lambs between the 1st and the 15th of May. With proper attention a black-faced sheep can be kept with profit wherever a native sheep can maintain itself. The difference between the two breeds is broadly this—one yields wool worth 2s., and a lamb worth 4s. or 5s.; the other yields 5s. worth of wool, and a lamb of 13s. value at least.

Pigs and Poultry.—Two sows are generally kept by the crofter, and the progeny reared on the produce and offal of the farm, including the small potatoes which are boiled for them, grass, on which they are often tethered like the other animals during summer, and boiled fish-heads. It is not often that corn is bought for feeding pigs, and they are only very moderately fattened as a rule. Those who do not breed are always able to buy pigs of their neighbours at 3s. each at six weeks' old. It need hardly be added that the breed is small and coarse. A pig-sty is not among the offices of the cottar's very deficient homestead, and the branches of in-door stock management previously referred to are conducted in any corner of the byre, and sometimes in a lair leading out of the dwelling-house. Swine are destroyers outside and inside the town. Their snouts may be considered as among the tillage implements on arable land, and working as they do out of season, they are a complete bar to the growth of grasses and winter roots. There can be no farming without division dykes to obviate the ranging of swine, and it will be a good day for fishermen-farmers when there is no longer the constant cry in the towns of, "Oh! the cow's in the corn! Oh! see yon pigs in the bere!" followed by the scampering in pursuit of dogs and those members of the family who are not "at the fishing." In summer the swine are turned on the field to forage and plough the common. Snakes, which are eagerly devoured by sows in the back settlements of the United States, are not found on the scathold, but animal food is obtained in many forms, including weakly lambs and nests of young birds. The pig is a small, long-nosed, bristled animal, with a short coat of thick hair.

In convenient situations crofters sometimes keep as many as fifteen or twenty hens for eggs, which the wives, who are great walkers, carry for sale to the district shops; and as the byres, where the fowls find shelter, are often attached to the dwelling-houses, and several houses are built in a cluster, back to back and end to end, their lodgings are always dry and warm. Geese are reared in large numbers. Their run being extensive, poultry thrive exceedingly well in spite of the damp climate.

The farms are almost invariably overstocked, owing to the breeding of a larger number of cattle for the scathold than the farmer can maintain during the winter. The head of stock kept on a farm of eight or ten acres, with unstinted scathold, consists, as a rule, which of course has many exceptions, of two or three ponies, three cows, their calves, yearlings, and two-year-old progeny, two sows, thirty or forty ewes, and five or six hens, whose feet are "smocked" or sewed up in rags, at critical times and places, while the gander is shod with a sort of cumbrous patten, to prevent his becoming a "beast of the field," and entering the corn plots. Where there is a good hill the ponies shift for themselves without food or shelter, elsewhere hay and straw are allowed. Cows get straw and a small portion of cabbage. Young cattle are turned on the scathold from the end of May until November, and are fed on straw chiefly in winter. Milch cows are tethered within the dyke during summer till about noon, when they are milked for the second time, and turned outside the dyke till evening. They are then brought back to the town pastures, milked, and put into the byres. Their attendants are the children and women. The following is an example of the stock management of a "ground officer" on some land of more than average quality:—There are eighteen acres of arable, nine acres of close pasture, and a ninth share of an enclosed scathold of 200 acres. The head of stock consists of four cows, two working oxen, two two-year-olds, two one-year-old, and two calves. After the middle of May the oxen are turned on the scathold when not at work, and also the two-year and one-year-olds, till 1st of October; the cows and calves are tethered on the close pasture and "ley" ground (weeds). There is a patch of turnips, and one acre of grass is mown for hay, and this, with straw, forms the winter provision.

2. *Sheep Farming and Large Farming.*

This section will be devoted to examples of farming by proprietors and by sheep farmers; and as their practice is systematic and easily capable of description, it appeared to the reporter that this portion of his undertaking would be best performed by giving actual examples.

The valley of Tingwall, stretching northwards from Scalloway, affords one of the best and least broken sites for farming in Shetland. The usual breadth of the valley is about half a mile, except at the upper end, where it becomes suddenly wider, and, with the valley of Dale, forms the site of a well-known sheep farm belonging to Mr G. H. B. Hay. The best part of Veensgarth, which is now in the occupation of Mr G. Bruce, is situated on limestone rock, and is sheltered in the lap of hills. A low hedge of hawthorn and furze, recently planted along the approach road, is at present thriving, under shelter of the surrounding hills and of the huge mass which blocks the northern end of the valley. Mr Bruce has contributed some of the details of his management to the pages of this journal, in his paper "On the Improvement of Natural Pasture without Tillage."* I shall, therefore, merely add to that account such details as did not belong to the subject. Mr Bruce has been fortunate, both in his site, which is as favourable for sheep farming as any in Shetland, and in his landlord, who expended large sums on the drainage, road making, and other permanent improvements of the farm, and in the erection of a first-class farm-house, and a most substantial and extensive range of farm buildings, with a threshing mill attached, and a mill for grinding corn about three miles' distance. The following are the chief points of interest with which Mr Bruce kindly supplied me in accompanying me over the farm. The sheep walk consists of about 3000 acres of hill and valley. The best grass is in the valley of Dale, which consists of old arable land laid to grass, and on the gentler slopes above, and especially on the limestone which underlies the whole of the western side of the farm, and may be detected by the superiority of the pasturage which covers it—the blue limestone in Tingwall Valley having been noticed, in the oldest agricultural accounts of Shetland, as producing the finest red and white clover. There are at present about 200 acres of ploughed land in the Veensgarth Valley, the whole of which Mr Bruce intends to lay down in permanent pasture, which will enable him to increase his flock of ewes by about 300. The existing flocks consist of about 600 Cheviot and 600 black-faced ewes, which are all crossed with Leicester rams. In Mr Bruce's opinion, Cheviots are as prolific as the black-faced, and as good mothers, so long as they remain on the better grass; but if they were on the hills together, the latter would yield a larger number of twins, and rear them better. Lambing commences about the 20th April, and the whole of the lambs are sold early in August; and 300 or 400 gimmers are purchased every year in April to keep up the breeding flock, in consequence of the home-bred lambs having suffered from braxy during recent winters. It is hardly necessary to add that the youngest ewes are placed on the sown grasses near home, where they get necessary attention and better food at yeaning times than the rest of the flock, which yeans in the valleys among the distant hills. The average crop of lambs is 1200, or one to each ewe; and I saw a remarkably strong, growing lot of half-bred lambs, which were sold for Leith in July, at three months old, at 27s. 6d. The provision for rough weather consists of about twenty-five acres of grass made into hay. Mr Bruce finds that his turnips are attacked, and sometimes destroyed, by fingers-and-toes, even on land that has never before been sown with that crop, and, as lime does not prove a specific, he intends to sow the arable land with grass seeds.

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* See Transactions, vol. iii. 4th series, 1870–71.

During the last few years some very extensive sheep farming has been introduced by Major Cameron's enterprising agent, Mr John Walker, who has obliged me with the following particulars. On the Holm of Noss, a good grazing island, with an area of about

1000 English acres, there are 300 Cheviot ewes, producing on an average 330 half-bred lambs, which were sold in August, without having received any artificial food, at 34s. in 1872, and at 30s. in 1873, in the country. Three other farms, with an area of 3000, 2500, and 1100 acres, in the parishes of Delting and Yell, have been stocked with Cheviot ewes, which have reared on an average about 900 pure Cheviot lambs. The wedder lambs are sold in August, and the ewe lambs are hogged. No artificial food is given. The prices of lambs have been 21s. in 1872, and 18s. in 1873. In future about 500 half-bred lambs will be reared, and sold annually on these farms. There are five other farms, with an area of 2500, 3500, 3000, 2000, and 1100 acres, in the parishes of North Yell and Delting. Mr Walker keeps 3000 blackfaced sheep on these farms at present, and he believes that they will carry 5000 head. At present no lambs have been sold from these farms, and the wedders have been kept till three years old. The Cheviot ewes, including the gimmers, have reared about 95 lambs per cent., and the blackfaced ewes about 100 lambs per cent. The question which of these breeds to keep on the enclosed scathold must be decided by the quantity of green ground, and the distance the animals have to travel for their food. The improved and drained scathold is exceedingly healthy, and the broken character of the hills affords ample shelter without any necessity for buildings. There is very little snow to trouble sheep farmers in Shetland.

An improved farm, which I am allowed to describe, now surrounds the house of Mr Andrew Umphray of Raewick. There are about 90 acres of sheltered land—75 of which have been reclaimed since 1860—encircled by the hill, except on the east side, where the ground slopes to the shores of the bay of Raewick. Pastures and corn fields now fill the hollow, in contrast to the barren scathold, which is, however, separated from the domain of Raewick by the farms of half-a-dozen tenants, which interpose the customary features of cottar management between the proprietor's land and the waste beyond, only that they are following the example before them by growing ryegrass and turnips, which they are able to do, as neither sheep nor ponies are allowed to trespass in winter, as they do in most other places.

A considerable portion of the reclaimed land in the valley behind the house was formerly covered with peat. The land was effectually drained at 18 feet, by 3½ feet or 4 feet, with pipes led into 8-inch mains, emptying into an open ditch, where the outlets are secured by substantial blocks of rough granite.

The soil consists partly of unexhausted peat and partly of a sharp gravel-loam, which is found to be better adapted for a system of sown grasses and rotation than for laying down in permanent pasture. As the best sown grasses would be replaced by native grasses in about five years on land of this character, the farm is necessarily a corn and turnip farm, with summer grazing and winter feeding of cattle. Ten shorthorn cows of good size are kept for butter, milk, and breeding, and their calves are reared. At two years old the latter are put on good grass, and are fed off with turnips. All horned cattle are wintered in the byre, chiefly on the produce of the farm. Milch cows at other seasons are put in the byre during night, and are turned loose in the grass fields during the day, and taken in to be milked and to rest for two hours in the middle of the day. In fine weather they are put out to pasture for a few hours in winter. This head of neat stock leaves little room for sheep.

.The rotation of crops is,—1, oats; 2, turnips; 3, oats; 4, grass; 5, grass. The mixture of "grass" is red, white, and alsike clovers, and perennial rye-grass. Both years' grass are fed, except such portion of the first year's crop as may be required for hay. *Manures:* 1 cwt. or 2 cwts. of guano for (1) oats; 10 bushels of bone and byre manure for (2) turnips. Five working horses are kept for this home farm and for an outlying farm two miles distant, the reclaiming of which commenced ten years ago, and is now progressing in the midst of an extensive waste, where 14 fields of 12 acres each have been laid off, 5 of them (60 acres) having been cultivated, and forming the nucleus of what may become a farm of importance. It has 2000 acres of pasture connected with it. A range of substantial buildings has been erected on this farm, including stables, byres, lamb houses, and barn, with water-power, threshing, and bruising machines. The soil consists of a white, sharp, granitic gravel, mixed more or less abundantly with vegetable matter. It is a light improvable soil, and promises well. The same rotation is followed here as on the home farm.

In the process of reclaiming, the roughest land is first levelled and then ploughed, after which it lies exposed to two winters' frost, when it is worked by harrows and cultivators. It is ploughed as deeply as possible the next season, and in the following year a trench plough with three horses is used after the common plough. It must be mentioned here that a hard, impervious, iron pan, more or less thick and compact, according to the depth of the former covering of peat, underlies the surface of the soil at a depth of three or four inches; and until this pan be thoroughly broken up and destroyed the ground does not become really dry and warm, however well drained it may be, and however well cultivated in other respects. A stone crop precedes other crops, and is useful for the partial draining which this portion of the estate requires and in the construction of dykes. The first crop on all the reclaimed land has been oats, sown with a dressing of 3 cwts. of guano per acre. Lime has as yet been only partially used, but where applied the benefit is perceptible through all the rotation.

The farm of Mr A. J. Grierson of Quendal is situated at the base of Fitful Head, and includes a level table-land of excellent pasture, projected from the southern side of the mountain to the entrance of Quendal Bay, and forming a promontory so exposed that when a gale drives the Atlantic against its low cliff, stones of several pounds' weight are lifted with the spray and rained down on the pasture. This is at the southern extremity of the farm, which consists of 400 acres of enclosed pasture and 80 acres of arable, extending northwards to the banks of Loch Hillwall, and eastwards to Quendal Bay and the sandy waste at its head. On the west the farm is overshadowed and sheltered by Fitful Head, the scathold of the tenants. The arable land lies chiefly in a hollow, extending from the mountain towards the bay, and consists of a black, sharp gravel or peat, which has been drained with stones 3½ feet deep by 10 yards between the drains. The pasture lies partly on a dark greenish sand, which is fertile, except in those places where it has been blown into heaps with complete destruction of the turf. Mr Anderson, the intelligent manager, gave me the following particulars :—

Crops.

Acres.
16 of yellow turnips, including a few potatoes.
32 of oats and bere.
16 of grasses.
16 of ditto, second year.

The mixture of grasses consists of 1½ bushel of perennial ryegrass, and 6 lbs. of red and 6 lbs. of white clover per acre. The stubbles are ploughed with two horses after harvest, and are cultivated early in May with a heavy iron grubber drawn by three horses. The land is ridged with a heavy dressing of farmyard manure and 3 cwts. of dissolved bones per acre. Turnips are sown about the 1st of June, and are horse-hoed, then singled, and again horse-hoed. An average crop is 20 tons an acre. The roots are pulled as required till January, and the remainder are heaped in the field and covered with earth to preserve them. The 16 acres of first year's grass are mown for hay, and the second year's grass is grazed. The *cattle* are 10 good heavy shorthorn cows, 10 two-year-old cattle, 10 one-year-old, and a pure shorthorn bull. They are managed as follows: The cows and two-year-olds get two bushels of turnips each in yards from November 1st to June 1st. The two lots are then turned separately on two pastures of 60 acres each on the sand land for the summer. The calves are born between the 1st of March and the end of May, and get their mothers' milk for four months, when they are put on the best grasses previous to putting them in yards, to be kept through the winter on uncut turnips and on oat and bere straw given in racks.

Sheep.—110 Cheviot ewes are put to Leicester tups, and require no shelter in winter, living all the year round on the 400 acres of pasture, without artificial food. Yeaning time, 15th of April to 15th of May. The lambs are sold in August, and the cast ewes are replaced from Caithness, whence the Leicester rams are also obtained. The average sale of lambs is 143.

There are four cart horses, Scotch carts, and iron swing ploughs. There is a mill on the burn running through this well-managed farm, and the water-wheel drives the barn and other machinery. Butter is sold at 1s. and 1s. 1d. a pound, and skimmed cheese at 3d. The sown grasses are cut for hay in the middle of July, and the meadow grass about August 1st. It is a genial spot, both as to soil and the sheltered site, and the harvest is early for Shetland, *i.e.*, bere is cut by machine at the end of August, and oats follow. Good crops are, per acre, 40 bushels of white oats, of 40 lbs. per bushel, sown about April 1st, and 35 bushels of bere, of 50 or 51 lbs. per bushel, sown about May 1st. The quantities of seed sown per acre are 6 bushels of oats and 4 bushels of bere. The corn is set up in stooks of 10 sheaves. *Wages:* The two ploughmen get L.14 and L.20 a year, with 6½ bolls (of 140 lbs.) of oatmeal; 1 Scotch pint of sweet milk daily; 4 bolls of potatoes (12 bushels a boll); a house; peats; and the grinding of their corn. Gardens are not needed. Two boys get L.10 and L.6 a year, and food and lodging in the house.

Mr David Edmondston informs me that he keeps about 400 blackfaced ewes, besides lambs to keep up the stock, and a few wedders, on farms belonging to Mr Thomas Edmondston of Buness, and situated at the north of Unst, and including some fine heather at Hermaness (opposite the Muckle Flugga lighthouse), on the Burrafirth farm. There are about 1500 acres, including the town land, Burrafirth having been a fishing station. Mr Edmondston also farms about 2000 acres, including 200 acres of cultivated pasture and arable, at Ordale, on the south of Balta Sound, also belonging to Mr Edmondston of Buness, where he feeds about 100 Cheviot ewes with half-bred lambs, together with 300 one and two year old wedders. From 50 to 80 of the ewes of the flock at Burrafirth are sold every year and replaced by their progeny. There is a good steading at Ordale where 40 cattle are generally housed, but on the hill farms the only shelter required is found under the 6-foot stone dykes and under the numerous braes. The only building required for the sheep farms is the shepherd's house.

Mr David Shepherd occupies the former manor house at Symbister, and holds the only sheep farm on the island of Whalsey; rent, L.260; 100 acres of land, formerly arable, and now chiefly laid down in grass, employing one pair of horses, and 1200 acres chiefly of hill pasture. The Bay of Whalsey, with excellent landing, lies below the house; and as this energetic Scotch farmer travels to market in his boat, and has land on eleven different islands included in the 1300 acres, the very picturesque little bay requires mention for its practical importance. The farm carries about 400 Cheviot ewes, the stock being kept up without purchase, and the lambs otherwise sold in August. In proof of the rise that has occurred in the price of stock, I may mention that Mr Shepherd "filled up the islands," three years ago, with two or three year old Shetland cattle at 30s. a head, and pays at present L.3 a head. They formerly came out fat at L.5 or L.6, and now at L.7 or L.8. In winter some of these isolated portions of the Symbister farm are so unapproachable by Mr Shepherd's boat, that the live stock are sometimes unseen from September till July, and occasionally the little cattle are washed out of the islands, being probably overtaken by the waves when seeking shelter under the rocks on the shore. The animals are removed when fat in the second summer, or possibly at the expiration of the first year.

Eighteen or twenty tons of turnips per acre were a common crop until fingers-and-toes troubled the plant, and led to the reduction of the breadth of arable land.

General Improvements, including Modern Cottar Farming and the Truck System.

The "harrying" of the hills is an essential element in the old system of cottar farming, and in populous districts the practice has reduced portions of the pasturage to almost absolute barrenness. There is no district where the scathold has been more scalped than on the hills above the fishing villages of Conigsburgh, Quarff, and Sandlodge, and in the district of Dunrossness. At Sound, in Unst, the hill is completely scalped, as well as in other localities too numerous to mention, where the natural covering of rough herbage and of heather has been destroyed. The ancient system of commonage was, and still is, a bar to agricultural progress. Every proprietor originally, and every tenant afterwards, turned as much stock on the scathold as he could keep; and any notable grazier owning or occupying a few marks of land took the lion's share of the unstinted pasturage beyond the dyke, and by skill or good fortune he practically got possession of the common which had been intended for the whole community. He won his position by merit perhaps, and he retained it, with his numerous head of stock, overrunning the district and treading under foot the interests of other industrious cottars. Any restrictions to the rights of commonage, such as are customary in the Faroe Islands, were unknown here; and although the quantity of stock thrust out beyond the dyke was, to some extent, limited by the capability of the cultivated land and the necessity of providing a handful of straw or hay in case of great need in winter, it will readily be conceived that individuals were sometimes tempted to rely too much on the scathold. Ponies, for example, were not expected to "look near" their owners during winter, and the consequence was that they were sometimes exposed to great hardship, and became pinched by starvation. It is a fact, however strange and lamentable it may appear to strangers, that, under the old system of scathold management, the ponies are never found on the wrong side of the hill dyke in spring, though prone to trespass at other seasons, because they are incapable of breaking the stone walls at that time. And they occasionally become so enfeebled during the winter as to be unable to rise without assistance. Scathold reform only became possible when the number of proprietors was so much reduced as to admit of united action, and, on the other hand, the divisions of commons have been incidentally the means of still further enlarging estates, as in the parish of Tingwall, where a resident small proprietor was compelled to sell his estate in consequence of the enclosure. He had raised, on his 3 or 4 marks of land, a stock of 300 ewes, which grazed chiefly on the property of a neighbouring proprietor, of 80 or 90 marks, whose tenants were men of less means or industry than their neighbour, who naturally resisted the enclosure; but, on apportionment, the length of the fence he would have been obliged to put up to secure his allotment obliged him to sell.

The *modus operandi*, with a view to division and enclosure, is as follows:—A proprietor raises an action of division in the Court of Session; a commissioner is appointed to examine titles and to conduct the division, and a surveyor is employed to walk the boundaries; and it is at that point that litigation commences between adjacent proprietors in reference to the apportionment of the scathold. As the division of the scatholds proceeds, a landed improvement may be effected, which will be attended by a considerable gain to the area of cultivated land, by the drainage of the very numerous and superfluous lochs (beyond what are required for water power), and many acres which are now drowned in stagnant water might be thus laid into pasture.

The division of the cultivated land of a township into "outfield" and "infield," and the run-ridge system, called in Shetland "rigga-rendal," were also derived from the days of small proprietors, when the different qualities of soil were apportioned so minutely, that instead of each family possessing a single plot, it had five or six strips in different situations, in order that the good and bad soils might be equally divided. This arrangement still subsists in some instances, though the redivision ("planking") of townships has made great progress in the last ten years, and there are very few villages now where the old custom of run-rig is adhered to. It has been already noticed that "outfield" and "infield" are terms that distinguish the worst land, which is left to take its chance, and receives the weakest manure, if any, from the better land, which receives more attention, and which has sometimes been so enriched by byre manure as to have carried successive crops of bere for a generation or more. This singular practice of highly manuring the infield was dependent on the right to collect "truck manure" on the scathold, inasmuch as the land could only bear such a scourging system of cropping when it was sustained by a frequent dressing of fresh earth. But the method of keeping up the fertility of the cultivated land by the destruction of the hill-pasture has not, in the long run, proved to be a rent-paying system of farming. It opens the door to individual rapacity. Every person who brings a pony load of "truck" from the hill, and who turns out his stock to promiscuous pasturage within the dyke, is unconsciously an enemy to society, because he destroys the national property, and either prevents the cultivation of root crops and rye-grass, or at all events compels the pitting of the roots before they are ripe. The whole mechanism of agricultural management, in regard to these usages, was, and is still, unfortunately, in too many cases bad, and altogether in opposition to the common weal. It is manifest that the enclosure of the scathold disturbs the old system of cottar-farming, compelling the "planking" of run-rig land, the fencing of farms, the growth of forage and root crops, the erection of better buildings for cattle, the improvement of breeds, and the use of corn or oilcakes in feeding. It is impossible to disguise the difficulty of effecting these improvements, which involve the teaching of an enlightened practice of husbandry to an entire population. In the south, as a Shetlander would say when speaking of Aberdeenshire, improvements have been effected by tenants under security; but the cottar is seldom farmer enough to be a party to such contracts as might be acceptable to a more intelligent agriculturist. A short time ago he scarcely conceived that his landlord had any right to profit by the increased value of property, and he is too often disposed to complain of a system of oppression and tyranny when he is overtaken by any one of that series of inevitable changes which I have referred to. His heart is more than half at sea; he thinks his lodgment on the shore is dearly rented at L.7 a year for more than as many acres within the dyke, with scathold, house, byre, and barn in the bargain.

Mr Shirreff remarked that the cause of the dependence of the cottars in his day was not *malevolent* on the part of the proprietors, and I may heartily repeat the observation as being equally true in the present difficult period of transition. Undoubtedly landlords are anxious that the condition of their tenants, as well as the revenue of their estates, should be improved. They are aware that agricultural progress cannot be confined to the surface of the country, but that it must include the farmer; and that the laird who would improve his estate without converting it into a sheep farm must undertake the agricultural education of his cottars. They know that farming is best taught to adults through the pocket, and that progress must depend in some measure on themselves or their deputies undertaking to encourage, persuade, or even gently to compel the adoption of improved systems. I may here give an example of a laird living in a level district, who introduced pony carts a few years ago on his own farm. The cottars, who had never seen such a curiosity as a cart, were greatly amused, and one of them was at length persuaded to borrow a cart in peat harvest. This led to the discovery that a cart holds more than a pony can carry on his back in two cassies, and that it can be drawn with ease when the hill behind the village is not too steep. Carts soon became general on that portion of the laird's estate.

Cottars admit that they know very little of the world, and they certainly are exceedingly persistent in adherence to established usage; nor is there any contrast between the farming of the comparatively few remaining small proprietors and that of their neighbours. Both are equally behind, and both need teaching by example. The education of a class of improvers is the great want of Shetland, and, as a matter of fact, few if any sites in Shetland have found improvers, except under the influence of a little gentle compulsion. When the agent of an estate which is in the van of improvement at present lately visited the property in Unst, the cottars, as one of themselves has admitted to me, used "to swarm round him like a nest of serpents." The response to everything suggested to them was, "it can't be done." Some of them were peculiarly obstinate in opposition. They were told to sow rye-grass, and they sowed it on the foulest land, instead of on the clean potato ground, and so on through the whole list of items of management connected with the new method. It required an immense amount of patience and the constant exercise of moral influence to teach them to farm; but when once the spell of ignorance was broken, and the time had come to reap improved crops, it would have been harder to get them back into the old rut than it was to get them out of it.

Speaking of the more careless or stubborn class of fishermen-farmers, it is not an exaggeration to say that their farming, such as it is, is conducted instinctively. Combined with a pliability of hand which makes every cottar an adept in half-a-dozen homely crafts, there is a singular rigidity of mind, and a manifest inaptitude to pick up new ideas in farming, or even to follow a good example when it is seen to be successful. The cottars are children in farming, and success in teaching them must depend on the patience and skill of the resident proprietors or their representatives. I have had the gratification of witnessing several examples of entirely successful teaching. One of the most successful of those who have devoted much time and untiring patience to the good work of teaching the fishermen-farmers the new system, writes to me as follows:—"Those who are farthest advanced would not go back to the old system for anything; indeed, I would rather undertake to train the untaught crofter out of the old system, and that I can assure you is no easy task, as all their old prejudices must be uprooted, than attempt to put back those who have learned the new plan. It is my decided opinion that in ten years the tenants will be in much better circumstances, and the crofts worth double their present rents. In my opinion, green crops and grass will grow as well in Shetland as in any district in Scotland, and when the crofter tenants turn their attention more to the growing of these crops and the improving of their cattle, they will soon discover that they can make more money in that way than by growing grain. Under the old system over three-fifths of their ground was put to corn, with no greater yield of grain than they will have under the new system with two-fifths."

It must, I think, be admitted that the cottars can hardly adopt improved systems without the encouragement and aid of improved buildings for their stock. This subject would be a very serious one for a proprietor—seeing that on every 100 acres of cultivated land let to cottars, there are twelve or more homesteads which ought to be enlarged—but for the fact that there are always as many builders as tenants on his estate, and that there are six winter months during which they have very little to do. A proprietor contemplating improvement will also remember that if his estate is to be doubled in value in "ten years," by an enormous expenditure of labour, it will be necessary to secure to these tenants and builders the fair value of their outlay in that respect. The same remark may be made in reference to such works as draining, breaking up new land, and the building of dykes. In many instances it would, no doubt, be necessary to direct the operations of improvement, as well as to tempt the cottars to commence them. This task would become easier when a beginning had been made in each district, and when an example had been set by those best men, who soon come to the front when they receive encouragement. In those cases where there is complete ignorance of the new system, it is essential that a skilled ground officer should be obtained; and it would be desirable, not merely to encourage the breeding of improved stock by offering premiums for the best animals, but also by forbidding, so far as may be possible, the use of inferior animals. The mutual inertness of some landlords and many tenants on the subject of agricultural improvement has arisen in the isolation of the country, its physical circumstances, and its fisheries. It is to be hoped that the attempt to introduce the improved system, which can alone preserve the population and the existing industry of Shetland, will be mutually and successfully made. It is, of course, a drawback that the means of communication between distant localities are difficult and slow. There are forty miles of sea, dotted with islands and rocks, between Lerwick and Uyea Sound, Unst, and although an agricultural inquirer may run down, with a fair wind, in five hours or less, there is always a liability that the return journey by sea may prove tedious, while the overland route includes pony rides of about forty miles, and two boat hirings across straits that defy the postman in bad weather! The southern part of the parish of Dunrossness, which is superior to Unst in soil, though not in management, is about sixty miles distant from that island. These difficulties render it exceedingly desirable that good examples should be multiplied. It is to be regretted that the only active agricultural society is that which was established in Unst four years ago with the object of exciting a spirit of emulation among the cottars, or tenants under L.10 yearly rent, who either compete among themselves, or enter classes which are also open to the larger farmers in Unst, of whom there are eight working a pair of horses, and one working three horses.

I propose to notice now a few points in reference to improvements that are either in progress or required, and then to describe the new system of "rotation farming."

1. The management of peats requires supervision, to avoid the slovenly system sometimes adopted. If the ground be dry, and intended for pasture, the replacing of the turf—laying down the feal—should be neatly done, and the surface made smooth; but if the land is to be ploughed the surface should be left rough, and exposed to the action of the air, so as to check a new formation of peat, which rapidly occurs in wet land.

2. The cultivation of the surface of the hill consists in the encouragement of the natural grasses by enclosure, and by the

prevention of overstocking. The improvement is manifest on many of the sheep farms. Moss land must be partially relieved of its superfluous moisture by a proper number of channels (sheep drains) for its escape, but the drains must not be so numerous as to spoil the grazing by converting the peaty surface into a sod of cork-like dryness, incapable of yielding its natural crop of *lubba* (*Eriophoron*, cotton grass), which, under the name of "moss-crop," is excellent food in April,—a period of the year when other herbage scours the sheep. Another surface, in the case of moss land, is when white moss covers deep old peat ground. Such peats are readily improved by setting fire to the moss in early summer when it is dry, and burns readily to a depth of three inches. After lying four or five years it becomes covered with heather and *lubba*, and produces profitable herbage, instead of remaining utterly useless. The drainage of peat moss intended for cultivation need not perhaps be made a specialty here, as the subject has been often and ably treated in the Transactions of the Society. Pipes are imported into Shetland from Scotland; but when the clay below is not reached, it is preferred to lay a floor of stones to prevent the bursting up of the bottom, and the wedge principle of drainage is adopted. The best application to the surface in bringing it under cultivation, whether for grass or corn, is a heavy coat of gravel, or sharp stones to be incorporated with plough and harrow, after which the corn brairds better and holds to the soil and stands up at harvest, far better than before, in consequence of the addition of silicious matter, and the increased solidity of the surface. Sown grasses are also less liable to be thrown out in this damp climate after the above dressing. An improvement, often easy to effect but less permanent, is the addition of shell sand from the shore. Lime, or lime composts by preference, are of equal efficacy and duration with shell sand, the cost being 50s. for 5 tons of lime.* Peat moss which is covered with heather and moss only, wears out sooner under crops than those heavier sandy peat mosses of slow growth, which are covered with *burra* and other coarse silicious herbage, which yields in its decay a large quantity of the inorganic food of plants. The latter yields three crops without manure, provided it be sweetened with a good dressing the first year. The land, if in good hands, is then sown with rye-grass.

3. I have noticed at p. 212 a method of bringing new land into cultivation by subsoiling to destroy the hard iron pan completely the first year; but as ponies are not adepts at subsoiling, and few even of the large farmers keep more than a pair of strong horses, a slower method is adopted by ploughing with two

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* Mr G. H. B. Hay has recently established some extensive lime-kilns at Girlsta, on the property of his nephew, Mr Harry Cheyne.

horses deeply enough to partly move and shatter the pan, which lies usually at a depth of about three or four inches from the surface, or deeper when peat had covered the ground for many years. The admission of air has the effect of considerably softening the cemented mass, and in the following year another inch of depth is gained, till at the end of three years the ordinary depth of ploughing is attained, and the pan is entirely disintegrated. Reclaimed land ought not to be laid down in pasture until the iron pan has been effectually destroyed; but in illustration of the effects of air in its passage through drained soils, I may state that even a covering of grass does not arrest the disintegration of the iron pan, though it may retard it. The cottar makes short work of the pan, though at great cost of labour, by trenching, and in some cases the iron-bound material is so hard that he is obliged to use a pick, as well as a strong spade, at a cost of from L.5 to L.7 per acre, reckoning his labour at 1s. 6d. a day, and the depth at 12 inches. After trenching the land, the cottar's short-sighted policy is to sow oats two years successively, with manure if possible the first year, and then to leave the land unsown. The new method is to use a compost of three tons per acre of lime, mixed with peat moss, and to sow grasses in the first crop of oats, taking two years' hay and forage before ploughing up the layer. Open soils, without pan, are simply dry, manured with sea-weed or cow dung, and sown, on the new plan, with—1, oats; 2, oats; 3, roots; 4, oats; 5, seeds. In some instances lime has a singularly good effect on the crops grown on enclosed land. It was applied in one instance to turnips, and the succeeding crop of oats was double that obtained on the unlimed land. Lime has in some cases, but not invariably, acted as a specific in the prevention of fingers-and-toes in turnips.

As an example of the method of reclaiming dry land on the sharp debris of the Serpentine by horse labour, I may notice the farm of Mr W. G. Mouat, a tenant under lease of Mr Thomas Edmondston of Buness, and the occupier of Springfield Farm on the north side of Balta Sound. One ploughing of three inches in winter buries the shallow covering of natural turf on this sharp land; 20 tons of shell sand per acre, supplying phosphates, and a coat of sea-weed, are the first dressing; and oats, sown about the 28th of March, are the first crop. After harvest the land is ploughed across the old fallow, and again the opposite way in spring. It is harrowed in preparation for turnips or potatoes. The drills are raised with a double-breasted plough, and then split to cover the manure, which consists of byre manure, so far as it will hold out, or 3 cwts. of dissolved bones per acre, or the same quantity of the "Challenge Manure," supplied by Messrs Langdale of Newcastle.

Potatoes are planted between May 1 and 12, and turnips sown between June 1 and 16. Mr Mouat's rotation is—1. Grass (3 bushels of perennial rye-grass, 3 lbs. alsike per acre); 2. Grass; 3. Oats; 4. Oats; 5. Turnips; 6. Oats or bere. Alsike is most productive here, even in the second year. The Scotch swing plough is used on this farm. The stone dykes were built by daymen paid from 1s. 6d. to 2s. 6d. for a day of ten hours; the cost per fathom for dykes 3 feet 6 inches high is 1s. 5d. Wages are high on this spot in consequence of Mr Edmondston's successful diggings for chrome ore.

It is necessary to make special reference to the agricultural improvements of Unst, where the enclosure of scatholds and the division of fields is far more advanced than in any other part of Shetland, though, unfortunately, there are still a few left undivided. Mid Parish, shut in by Crucifiel on the north, embraces the centre of the island, and between Balta Sound on the east and Vallafiel on the west, the dykes, enclosing fields from half an acre, close to the cottars' doors, to from four to fourteen acres, are continuous.

The heavy crops of perennial rye-grass growing on cottar farms along the burn of Vallafiel, which runs down the valley into the lock of cliff, attest the excellence of the climate for grass.

A brief description of the farm of Mr Joseph Monsel, an enterprising cottar tenant, will at once suggest the nature of the changes involved in the recent improvements in that part of Unst where the common has been enclosed. Mr Monsel farms seven marks of land, under a lease of twenty-one years, on Major Hamilton's estate, for which he pays a yearly rent of seven guineas. The other charges are the tenant's share (a moiety) of the poor's rate, of 2s. in the pound, and of the "road money," a rate of 8d. in the pound. The tenant has built his house and small shop, and divided the farm into four fields, by means of stone dykes, one field being subdivided by wire. As the adjoining grazing ground—formerly the common, or scathold—has been enclosed and Major Hamilton's portion of it let to a sheep farmer, Mr Monsel turns his cattle on an unenclosed scathold of Lord Zetland's at a little distance, paying Messrs Spence & Co., the tenants of the scathold, about 32s. a year for the privilege. The usual head of stock is six cows, of which three are in milk on the average, and eight ponies to fetch peat from the adjoining steep hill of Vallafiel. Both the cows and the younger stock are turned on the scathold every day in summer, except in the roughest weather, and are tethered, morning and evening, on the grass nearer home. The land is not kept under rotation, but is cropped as follows:—4 marks are in white and Shetland oats every year; 1 in sown grasses, which I found clean and full of red clover; the remainder of the

7 marks is in potatoes. Three years' oats in succession, Mr Monsel thinks, would be too much for the land. This small farm, of less than 25 acres, is quite an exception to the customary cottar management, being a perfect example of the effects of industry, spade labour, and perfect cleanliness, in keeping up the yield of crops, on a good soil, without any artificial feeding of stock, or any importation of fertilising substances, except the grass and heather brought from the hill as bedding for the animals. It should be stated, however, that the land is of good staple, naturally dry, and having been formerly for many years the infield of two cottages, it was permanently improved by the extra manure which the infield received. The tenant attributes his success to the cleanliness secured by well-managed spade husbandry, and by keeping the land in crop, instead of abandoning part of it to the weeds that collect on unsown and unploughed "ley." The ground is dug or "delved," to use the customary expression of the neighbourhood, by women, who are paid 10d. a day, or 6d. and food. Mr Monsel says he should use a spade when delving himself, but the women use the narrow tool of the county, and work in gangs of three, and by their united action they make a "fine delving," of two depths, in the following manner:—The three blades are driven together into the ground and the top spit is thrown forward, the bottom spit is then well "sorted," or stirred with the blades without being entirely inverted, and in this manner ten-inch cultivation is obtained in deep land. This very effective but primitive method of tillage is attended by a drawback which, perhaps, should be mentioned, as accuracy of detail ought to be the leading object in an agricultural report. It seems that in practice, when three women work in concert, and "sort the mould" in close contact with each other, work sometimes ceases and discussion commences; and under such circumstances the "sorting of mould" proceeds in a somewhat intermittent manner, and more time is wasted than the employer could desire. The labour of constructing the dykes surrounding the fields on this farm, as well as the building of a garden dyke, and another for a little pasture for calves or other weak stock, was accomplished by the tenant, with the aid of a little hired labour, at a period when, he assured me, he quite enjoyed wheeling a barrow of stones. As the materials are not quite close at hand on this spot, the cost of contract work is 6d. a yard for walls 3 feet high.

Another cottar farmer, who is equally successful, though his farming is on a smaller scale, is Mr James Smith, of North Westing, Unst, who has a life lease of 2½ marks on Major Cameron's estate, and has come "to end his days," after thirty years at sea, close to his birthplace. Foreign travel has, perhaps enlarged his mind, for his farm is managed under the new system of rotation, which he has adopted voluntarily, while some of the fishermen near have not yet been able to change their plan, though under engagements with their landlord to do so. James is bounded on one side by the nearly perpendicular cliff which rises 700 feet above his house; he has a peat bog on another side—a great advantage, since he has only one pony to keep for fetching fuel; and the plots of three or four neighbours, lying at a lower level, interpose between him and the Atlantic. It is a novel site for a model cottar-farm. Notwithstanding its natural barriers, the system of "rotation" could not be adopted previously to the recent enclosure and protection of the plots by dykes, because, under the old system, all the pigs and cattle belonging to the little colony of crofters at North Westing used to range at large as soon as the corn was cleared in the autumn. James, being a careful stock and turnip farmer, prefers the new plan; but the feeling is not unanimous, and there are others who still regret that their kine can no longer run over the country and down to the shore to feed on the "ware," and divide the provision of nature and of the "ley" ground between them. James Smith keeps four kine, besides pigs and poultry, on his slope, which is naturally dry, and is watered by a little burn. He finds that the rye-grass is better food in winter than straw, and that it "prepares the land for corn," besides banishing both the "muckle and the little cockiloories" and the gay gowans that so often paint the corn fields around with their bright colours.

I may sum up the tillage operations on this neat plot by repeating a single sentence of the occupier, who, after remarking that autumn cultivation was inexpedient in that damp climate, added, "About the middle of March we come forth, my daughter, my sister-in-law, and I, and we delve it, and have our potatoes and corn all in, fine! by the middle of April."

It must be admitted that the fisherman-farmer has some slight excuse for obstructing improvement when his plot is poorer than his neighbours.' It is not the system of "rotation" which is at fault in any case, but it is the man in the main undoubtedly, and the most energetic man, who is the best fisherman, would also be the best farmer if his time were not occupied; still, there is a word to be said to shelter what seems at first like wilful obstinacy on the part of some of the obstructors in the agricultural parish of Westing. Some of the cottars occupy very much poorer sites than others, and as they are all under obligations now to convert a portion of the former waste lying near their cots into arable land, which has to be brought under "rotation" in order to support the animals that formerly grazed on the common, their task is much harder than in the case of those neighbours who occupy better land, by the burn or on some naturally richer spot. The soil of Westing is generally stony land, resting on rock, and of moderate quality.

Mr Peter Smith is foreman of a fish-curing establishment at Westing, and farms on Major Cameron's estate, which is sublet on tack to Messrs Spence & Co. He is a yearly occupier of about 22 acres, including 10 acres under the spade, some cultivated pasture, and a small piece of barren wet land on the shore. The rent is L.7, and 7 per cent. on the outlay (L.30) on a new slate roof to the house.* Peter Smith is a decided advocate of the system of rotation, which enables him to keep cross-bred cattle, including four milking cows, yielding far more produce than their predecessors.

The 10 acres are distributed among the following crops :—

2 acres first year's grass; 2 second year's grass; 4 oats and bere; 1 green crop, potatoes and turnips; 1 acre of cabbage, or occupied by the corn-yard. The system of cultivation is to dung heavily for the green crops, which are followed by bere, sown with grass to remain two years; oats follow the grass. There are four ponies on this farm; sheep, ponies, and young cattle are kept on the scathold, at a payment of 4s. in the pound rent; and two pigs are killed every year after they have been fattened on boiled potatoes and on the siftings of corn, which is ground at the nearest mill on the burn. The process of haymaking is as follows :—The rye-grass is cut about the 20th of July, the natural grass about the 12th of August, with common scythes. It is dried as fast as the weather permits, and made chiefly in cocks or coles, which are turned frequently till dry, previously to putting the hay into the stack in the barn-yard. Formerly, meadow land was cut about the 20th of August, and the grass allowed to lie on the ground and bleach for days before it was gathered into cocks.

At Burrigarth, near Westing, there is, in the midst of improvements, a curious example of the primitive arrangement of riggarendal, still persisted in by three small proprietors, whose land, instead of being a gravel on rock, like much of that in Westing, happens to be the best in the neighbourhood, being a strong earth on clay and gravel. But it lies undrained and in bad plight.

I will add to my note-taking in this district the following communication from Mr Alexander Sandison of Uyea Sound :—"Under the old system so many cattle were kept that they were half starved in winter; the people were satisfied if they could only sustain life in them till May, when the grass comes. There is no doubt that the new system has largely increased the amount of cattle food, but considering that the cattle have now been largely crossed with shorthorn bulls, they cannot profitably keep as many of the crosses as they did of the native breed; and it is already manifest that the man who keeps fewest cattle and feeds highest in winter makes most out of his farm. Some cross-bred year-olds belonging to crofters sold at the Whitsuntide sale here this year (1873) for L.6, 8s., those worst fed bringing L.4, while the native breed of the same age only brought from 25s. to 30s. One of my shorthorn bulls, from the stock of Milne of Kinaldy, now three years old, is the sire of 300 calves. The white oats are now being largely sown, and they are fast taking the place of the old native small black oats. As to the difference of yield of corn, in some cases, under the old system, oats were sown on the same ground over and over again without a change or rest for ages; the hills were robbed of earth to mix with dung for manure; and thus a crop was forced which was sometimes heavy in straw, but could not yield much bread. The indolent crofters, who did not look for new earth, got little or no crop. The ground in 'ley' was generally such parts of the farm as were so full of weeds and so utterly worn out that they could yield nothing but weeds, so that very little corn was produced even after two years' ley. Now the oat crop is, or ought to be, grown on land cleaned by green crops, and on ground broken up after two years' grass. One thing on which the crofters particularly remarked last year was how fine-looking and clean their land was after the grasses."

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* As it is necessary to raise the wall of the cottage, a ceiled slate roof, 12 feet by 28 feet, the usual size of a Shetland hut, cannot be completed for less than L.30. The repairs of a thatched hut, which needs roping and strawing every year, cost 10s., reckoning the cottar's labour. The best end of some of Major Cameron's houses is floored with boards; the other end with blue clay equal to asphalte.

I believe the customary yield of the oat crop under the improved system is about 4½ quarters (generally spoken of as 4½ returns) to the acre; bere yields about one-fourth more.

I may mention here that some years ago Scotch farming was introduced into Bressay by the proprietor of the island, by means of a grieve from Berwickshire, who first managed the farm of the proprietor, and then leased a farm and successfully cultivated turnips, rye-grass, and clover, an example which was followed by a few who had special advantages, but not by the many who were debarred by poverty, want of leases, of fences, and of roads, and by the run-rig system. Excellent roads now pass through the principal islands.

It seems unnecessary to enlarge on the demerits of the system of truck, which has been described in a previous section, and is undoubtedly among the drawbacks which have retarded improvements. A subject that has occupied several bulky blue-books cannot be discussed exhaustively here. In fact, it would have no place in an agricultural report, were it not that the agricultural and social relations of Shetland are peculiarly correlative.

In the report of the commissioner appointed to inquire into the operation of truck in Shetland, and laid before Parliament two years ago, the remedial measures which Mr W. Guthrie ventured to suggest lie in a very small compass. After saying, in reference to the land laws, that "legislation ought not to be of a local and exceptional character," he suggests that fishermen-farmers should have a warning of a year, instead of 40 days, with payment for extraordinary expenses on houses and lands.

Tenants of seven or eight acres are usually a dependent class, and landlords hold an important trust in regard to them, which cannot be abused without their suffering. Unfortunately truck rivets the fetters upon tenants, and places landlords under the temptation to farm their industry by means of middle-men. The system becomes oppressive in fact, as well as bad in principle, when lairds and tacksmen exercise their trust without forbearance. The worst managed estates and the most oppressed tenantry have been in the hands of extortionate tacksmen (see commissioner's report), and on the other hand the most improving estate which I have seen is in the hands of tacksmen of a different character, who have undertaken the agricultural instruction of the tenants. Evidently the onus of initiating improvements rests with the landlord.

It has been suggested that the industries of fishing and of farming would each thrive better if they were separated; but this view does not appear to be borne out by evidence. As arable farming is, however, so extremely unproductive in the hands of fishermen, it would, I believe, in many cases be desirable to reduce the quantity of arable ground to a minimum, allowing a tenant only enough for the growth of potatoes and garden vegetables, with the addition of sufficient fenced pasture ground to yield grass and hay for the maintenance of a good half-bred cow. The lesson for the cottars to learn before they can prosper in farming is the method of obtaining profit from cultivated land by the growth of crops which indirectly afford milk, meat, and manure. The land cannot become productive so long as the non-restorative crops are alone relied on, and while the cottars cling to the mistaken idea that a poor man's land must be continually wrought and cropped with corn for the maintenance of his family.

ERRATUM.

An accident prevented my visiting the sheep farm at the Noss in Bressay, with the factor, and I have unfortunately placed the farm, in this Report, upon the Holm instead of upon the Noss. H. E.

ON THE AGRICULTURE OF THE ISLANDS OF SHETLAND.

By ROBERT SCOT SKIRVING, Camptoun, Drem.

[*Premium—Ten Sovereigns.*]

SHETLAND has, during its whole history, suffered much from its geographical position; and though an integral part of Scotland, having upwards of 31,000 inhabitants, and forming politically one-half of a Scottish county, it is probably less known to most persons in Great Britain than distant colonies or foreign countries.

Even when the extreme south and north of Scotland are spoken of, people are apt to deem with Burns that "frae Maidenkirk to John o' Groat's" comprises the whole kingdom, forgetting that beyond the mainland are situated two archipelagoes forming an important county, with a peculiar and romantic history, and containing within their limits nearly 63,000 British subjects, who look upon Sutherlandshire as that southern land which its name was originally intended to express.

The very maps of the British Islands foster this forgetfulness of Orkney and Shetland, as almost universally both groups appear only on a minute scale, ignominiously pushed into some corner of the plate. The spirit of progress and the material means of advancement which for years past have brought Orkney nearly abreast of other Scottish counties have at length reached Ultima Thule, and the steamboat and electric telegraph will rapidly bridge over the distance which separates the more remote archipelago from the mainland, whilst enterprising settlers from the south are, bit by bit, introducing the agriculture of Scotland among the islands of the north.

The whole history of Orkney and Shetland is peculiar, and the infamous tyranny to which they were for centuries exposed, and which continued until a comparatively recent period, crushed the energies of the people, and condemned them to drag out existence from generation to generation in a state of want and utter wretchedness. Chiefly from its greater proximity to Scotland, and also from its richer soil, Orkney was emancipated from this position at an earlier period than Shetland, and, as already stated, has for years past shared in the general progress and prosperity of the kingdom. Shetland unfortunately lags behind the sister group, retarded partly by its inferior soil, partly by its more remote position, but more than either of these by the feelings and habits of its native population. Old customs and ancient prejudices, which have disappeared from Orkney, still exist in Shetland, and offer a stolid resistance to every attempt to introduce into the islands the improved systems of modern agriculture.

Even at the present day, the peculiar history of Shetland exercises so material an influence upon its whole circumstances, and especially upon its agriculture, that a slight sketch of it seems almost a necessary preface to any description of its present position.

One would scarcely imagine that a group of rocky and comparatively barren islets, situated in a northern ocean, could have excited the cupidity of avarice, and have become the scene of a cruel tyranny and a grinding extortion, which for centuries reduced the inhabitants to the lowest depths of misery, and rendered them without doubt the most unfortunate population in Europe. This wretched state of matters has long since passed away; but the influence of former oppression still to some extent affects the feelings of the people, and makes them regard Scotland and Scotchmen with something like distrust, if not with absolute aversion.

Of the more remote history of Shetland nothing whatever is recorded, but the archæological remains scattered over the islands indicate with sufficient clearness that they were peopled by the same Celtic race which inhabited the Orkneys and the north of Scotland; but it is only from the seventh century that their history may be said to begin. At that period numbers of Norsemen, flying from the tyranny of Harold Harfager (the Fair-haired), who had made himself master of Norway, took refuge in the remote islands of the northern ocean, Iceland, Faroe, Shetland, Orkney, and the Hebrides, from whence they made frequent piratical excursions to Norway, upon the shipping of which they took revenge for the wrongs they had sustained. They were, however, soon taught that they had not escaped from Harold, as the warlike sea-king followed them to their ocean retreats, and quickly conquering the islands of the Scottish coasts, annexed them to his kingdom. The Orkney and Shetland groups he formed into an earldom, over which he placed one of his kinsmen as viceroy.

From this period the islands became a colony of Norway, ruled over by earls who held directly from the Scandinavian kings, and for three hundred years nothing seems to have happened to direct towards them the attention of Scotland or to excite the interest of the historian.

In the fourteenth century, in 1379, Henry Sinclair, a Scotchman, succeeded through marriage to the earldom of the islands, the male line having become extinct in the Scandinavian family. This change of blood made, however, no alteration in the tenure by which the earldom was held, the earls being subject as before to the kings of Norway and Denmark, who made it a strict condition that no alteration should be made in the Scandanavian laws by which the colony was governed.

Sinclair and his descendants continued to govern Orkney and Shetland for nearly a century, when a great change took place, and the islands were mortgaged to Scotland by the king of Denmark in pledge for the ultimate payment of a marriage portion.

In 1468, James III. of Scotland married Margaret, Princess of Denmark, her not inconsiderable dowry being the discharge, without payment, of long outstanding Scandinavian claims on account of the Hebrides, as well as the promise of 58,000 florins, for which Orkney was pledged for 50,000, and Shetland for the remaining 8000; sums which sufficiently indicate the different values placed on the two groups, though their superficial extent is nearly equal. From time to time Denmark has sought to redeem these islands, and able lawyers of both countries have entered into learned arguments as to the legal bearings of the case; but it may now be taken for granted that possession constitutes somewhat *more* than "nine-tenths" of the issues in dispute.

Orkney and Shetland became, from the date of this marriage, an appendage of the Scottish Crown; but it is the just and reasonable complaint of the islanders to this day, that, in direct violation of the stipulation made by Denmark at the transfer, feudal tenures were arbitrarily introduced, and the ancient rights of the Udallers gradually set aside. This is no mere romantic and antiquarian complaint, and in many instances the landowners of Shetland are able to show that, while all the feudal taxation of Scotland has been imposed upon them, many of the Scandinavian imposts remain unrepealed.

For more than half a century the change of rule seems to have been lightly felt by the islanders, but when in 1530 James V. attempted to make a hereditary grant of the islands to his natural brother the Earl of Moray, the inhabitants rose in rebellion, and in a battle fought in Orkney entirely defeated the forces sent against them, inflicting a loss upon the Scotch troops of 500 men, and James, either from a sense of justice, or more probably from policy, pardoned the insurgents and withdrew the grant he had made to his brother.

Upon the annexation of the islands to the Crown, it was declared by Act of Parliament that they were never to be alienated unless to a lawful son of the king, but, by a singular perversion of this stipulation, they were handed over as a gift to natural sons only of Scottish monarchs.

In 1565 Queen Mary repeated the illegal act of her father by making a grant of the islands to her natural brother Lord Robert Stewart, Abbot of Holyrood, for an annual payment of 2006 pounds Scots. Two years afterwards Mary capriciously revoked this grant to bestow it on her favourite Bothwell, but on the attainture of that Earl it again reverted to Lord Robert, who was succeeded by his son Patrick; and during the rule of these two Stewarts, which subsisted for half a century, the islands were misgoverned and the inhabitants oppressed to an extent that can scarcely be paralleled in the history of any other portion of Europe.

The elder Stewart, taking with him a band of "soldartes and broken men," whom he called his army, began his rule by inaugurating a system of robbery and oppression which set every principle of law and justice at defiance.

The people pathetically complained that "they were heavily troublit, percit, and oppressit," and that they were "so holden under thraldom and tyranny that they had na passage be sea ner land," to seek for justice or even "do their lawful errandis and business."

The sore cry of the oppressed did, however, reach Edinburgh, and Lord Robert was three times recalled to answer the charges made against him, and on one occasion, when lodged in Dumbarton Castle, he caused his natural son Robert to attempt a rebellion in the islands, which resulted in that unfortunate youth being taken prisoner and executed at Edinburgh.

Stewart, however, always found means to obtain the favour of the Court, and died in possession of the jurisdiction of the islands.

He was succeeded in the administration by his son Patrick, who improved upon the vices and exceeded the rapacity of his father, and proved to the islanders that under the rule even of Lord Robert, the lowest depth of misery had not been reached, and that the son transcended the father in cruelty and merciless oppression.

It was Lord Patrick who built the Castle of Scalloway, a stern, square stronghold, the walls of which, though roofless, and robbed of ornament to decorate a paltry modern mansion, still remain in their strength, and still frown down on what is perhaps the fairest scene of mingled land and water of which Shetland can boast. It may truly be said that

> "Beneath these battlements, within these walls,
> Power dwelt amidst her passions in proud state,
> The robber-chief upheld his armèd halls,
> Doing his evil will."

His career was fortunately at length cut short in 1613, when he was executed at Edinburgh, not, however, as he fully merited, for his cruel oppression, but because he had come into collision with the Bishop of the diocese, and because he was accused of treason against the Crown.

The student of Scottish and English history may observe with interest the singular identity of character which seems to have existed between the later monarchs of the unfortunate House of

Stuart and those of the bastard branch who ruled over Orkney and Shetland, though in the latter case the family vices were more fully developed, from the almost total absence of check or control. The same selfishness, perfidy, cruelty, and helpless inability to learn or unlearn, from their own experience or the example of others, brought the latest of the tyrants of Shetland to the scaffold, which seventy-five years afterwards drove the last of the Stuarts from the throne of England. But though Lord Patrick was punished, the wrongs of the islanders were not redressed, the illegal imposts being continued by the Crown.

In 1641 Charles I. granted the jurisdiction of the islands to his favourite the Earl of Morton, and it remained in his family till 1747, when it was resumed by the Crown on paying the Earl L.7200 (sterling), and in 1776 his Lordship finally sold his property in the islands to Sir Lawrence Dundas for the sum of L 60,000, in whose family it still remains in the person of his great-great-grandson, the Earl of Zetland, who succeeded his father during 1873.

During its subsequent history Shetland has formed an integral part of the British empire, and has of course shared in its just and liberal government, but it was not till 1832 that it secured the privilege of returning, in conjunction with Orkney, a representative in Parliament. In everything else, save early history (and in this joint representation), Shetland must be considered as entirely distinct from Orkney, with which it has in fact less internal communication than with the Lothians, or, in so far as its staple article of traffic, fish, is concerned, we may say with Spain.

Whilst the wrongs of which Shetland had for centuries such just cause to complain have long since passed even from the memory of Scotland, the scars, so to speak, still remain in the northern islands, and their inhabitants still hand down from father to son a feeling of resentment for wrongs received, and a distrust of the Scottish settler, whose skill and capital must nevertheless inevitably tend to progress and improvement.

In geographical position the Shetland islands lie between 59° 51′ and 60° 50′ north latitude, and 0° 40′ and 1° 50′ west longitude, and are, with the exception of Fair Isle to the south and Foula to the west, in close proximity to each other. The group is reckoned to consist of upwards of a hundred isles, of which, however, only 30 are inhabited, and the great majority are mere rocks and skerries detached from the larger islands.

The whole group forms a comparatively narrow stripe of land, stretching from its southern point in a north-easterly direction, thus forming, as it were, a termination of the general outline of Scotland.

The distance from Sumburgh Head in the south to the northern extremity of Unst may be reckoned at 75 miles, whilst 25 miles across Mainland may be taken as its greatest breadth.

Perhaps no country is more irregular and fantastic in its outline than Shetland. Like many of its sea-worn rocks, which are so strangely scooped out and caverned by the waves, the islands themselves have been apparently shattered by convulsions of nature, and eaten into by fierce ocean streams, till they present the appearance of a skeleton only of a land, the other parts of which had disappeared.

Whether looked upon in the map, or gazed down upon in reality from such a summit as that of Rona's Hill, we may almost fancy we see a country in the process of disintegration, a vast mass of rock which is from some cause melting away.

The rocks, however, are stern and hard, and present a front to the two oceans by which they are lashed—the Atlantic in the west and the North Sea in the east—which, so far as the generations of men are concerned, may be said to show no sign of change or decay.

The absence of trees in Shetland leaves a blank in the landscape, and is in many ways a loss to the islands. It is not easy to account for this total want of wood, and many theories have been broached on the subject.

That Shetland was not always destitute of timber is proved by the remains of multitudes of trees found in the bogs, whilst the fact of birch woods being common in Iceland is sufficient evidence that trees can brave a far more rigorous climate than that of Shetland. Some persons have indeed suggested that a chief cause of the failure of trees is to be found in the absence of frost during winter. This, they say, encourages a too early development of the buds, which are in turn destroyed by the cold sea breezes of the protracted spring. In several places small plantations have been reared, chiefly within enclosures near houses. There is a clump of thriving trees beside a dwelling-house near Lerwick, and there is what may be called a small plantation on the property of Mr Edmondston at Balta Sound.

These prove that, with sufficient care, trees can be grown in Shetland, and that proprietor would deserve well of the islands who would give planting a full and fair trial, under as favourable circumstances as could be obtained, shelter being perhaps the chief desideratum in Shetland.

Among the industries of Shetland is the manufacture of kelp. The collection of sea-weed for this purpose was formerly one of the chief occupations of the people, whilst the profits arising from its sale formed a large portion of the revenue of many proprietors. So much was this the case, that estates were counted valuable or not, according as they possessed or wanted rocky shore lines, prolific of marine vegetation; kelp made from tangle cut from the rock being better than that manufactured from drift sea-weed. Science having discovered cheaper modes of making glass than by the use of kelp, that article fell so much in price that its manufacture was almost extinguished. Again, however, fresh discoveries have found new modes of using kelp, the industry in which has consequently considerably revived. The price of the article, though not equalling what it formerly did, has considerably increased during recent years; and once more, on almost every Shetland shore, women are to be seen busily employed in cutting sea-weed, whilst curling wreaths of smoke, rising up from place to place on the coast, indicate the spots where the produce of their toil is being converted into kelp.[*]

As regards geological character, the rocks of which Shetland is formed are all primary,—gneiss, greenstone, granite, quartz, and hard clay,—stone-slate being prevailing formations; whilst the eastern half of the long peninsula which forms the southern

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[*] *Number and Amount of Live Stock, Green Crop, Corn, and Pasture Land, in Shetland for the year* 1872.

	ORKNEY.[†]	SHETLAND.
Horses,	5,669	5,332
Cattle,	24,401	22,009
Sheep,	28,849	92,365
Pigs,	5,866	5,260
	Acres.	Acres.
Potatoes,	3,555	2,920
Turnips,	11,144	456
Cabbage,	82	147
Vetches,	...	3
Wheat,	3	...
Barley or Bere,	6,263	2,417
Oats,	28,675	9,181
Grass under rotation,	22,823	612
Permanent pasture, exclusive of heath or mountain land,	15,767	33,339
Bare fallow,	1,438	1,873

Rate of Freight from Lerwick

	To Aberdeen.			To Granton.		
	s.	d.		s.	d.	
Shetland Fat Ox,	8	0	each	10	0	each.
Shetland Lean Ox,	6	0	„	8	0	„
Ponies,	8	6	„	10	6	„
Sheep,	1	10	„	1	10	„

From the above figures, it will be observed that while Orkney greatly exceeds Shetland in the amount of land under cultivation, there are far more sheep in the northern islands.

[†] The corresponding figures for Orkney are also given for the sake of comparison.

extremity of Mainland, as well as the islands of Bressay and Noss, are composed of a coarse variety of the old red sandstone.

In the north, serpentine enters largely into the formation of Fetlar and Unst; whilst in the north-west, the ocean precipices of Rona's Hill exhibit a magnificent red mass of syenite, dark, and glittering with hornblende, and bright with felspar.

As in the east, so in the extreme west, the lonely island of Foula is of sandstone formation.

The general character of the coasts of Shetland is abrupt and bold, ramparts of tremendous rock rising up sheer from the ocean, many of them exceeding 1000 feet in height. The chief of these awful precipices are Sumburgh and Fitful Head in the south, Noss and Burravoe on the east, the extremities of Unst in the north, and, greatest of all, the terrible and sublime mountain wall with which Foula in the west meets the shock of the long wave of the Atlantic.

The possibility of Shetland maintaining its position as a habitable country, with fisheries, pastures, and cultivated fields, rests in the fact that it possesses in its deep-cut voes and tortuous sounds many noble harbours, and in its frequent sloping shores and turf-clad holms numerous stretches of land adapted for cultivation, as well as for the rearing of flocks.

The greatest elevation in Shetland is that of Rona's Hill, which rises abruptly to a height of 1400 feet above the sea. The general character of the islands, however, is not mountainous, but on the whole presents to the view a series of undulating elevations, the prevailing soil being a wet peat moss and bog. much of which furnishes fuel, but is incapable of any kind of cultivation. Small fresh-water lakes, many of them filled with excellent trout, are extremely numerous, and from them many tiny rills issue forth to the sea, which can be seen from almost every part of the whole group of islands. As a general rule, it may be said that, with rare exceptions, such as occur in the parishes of Tingwall and Dunrossness, the best soils are near the shore, then comes a zone of peat and bog, and then the hill land covered with short heather and scanty herbage.

In determining the nature of the agriculture of any country, climate plays a more important part than even the soil itself. Man may entirely change the conditions of the one, but can only slightly modify the character of the other. If we mistake not, the prevalent ideas concerning the climate of Shetland are peculiarly erroneous. It is frequently imagined that, as the islands lie far north of Scotland, in the latitude of St Petersburg and Siberia, they must be exposed to the rigours of an almost Arctic winter, frozen and snow-clad, and shrouded in months of night. Shetland, on the contrary, enjoys a temperate climate, with no winter, in the northern sense of the word. It is moist, and wet, and windy, but it has less frost or snow than London or Paris; whilst the shortness of the day in winter is by no means so marked a feature as is the almost unending light of midsummer. The latitude of Shetland is, indeed, so high that it would indicate a winter temperature of, we may say, only 3°, whilst in point of fact it enjoys one of about 39°. This amount of warmth it owes to the heat of the sea, specially increased by the action of the Gulf Stream, the influence of which is communicated to the islands by prevailing westerly winds.

The mean annual temperature of Shetland, as estimated by various accurate observers, may be stated at from 45° to 46°, the winter temperature being, as stated above, 39°, and that of the summer 53°. At Bressay, the valuable tables kept by the Rev. Dr Hamilton show that February and March are the coldest months, with mean temperatures of 38° 4′ and 38° 3′ repectively, whilst August is the hottest month, its average temperature being 54° 8′. Taking all the year round, the temperature of the Shetland Islands may be reckoned at 45° 4′, being rather more than one degree below what may be given as a general average for Scotland.

The following table may serve to contrast the temperature of Shetland with that of the south of Scotland and the north of England:—

	January.	July.
	° ′	° ′
Edinburgh-City, ...	36 3	58 3
Carlisle, ...	38 1	59 0
Bressay, ...	39 9	53 4

Thus, while in Shetland the heat of July is considerably less than that of Edinburgh or Carlisle, its temperature is higher than either in the beginning of the year. But the distinctive feature of the temperature of Shetland is its comparative equability, the variations of the thermometer not being so great as in other parts of Britain. The less amount of heat obtained in summer is to a considerable extent counterbalanced by the increased length of the day; whilst in winter there is little absolute frost and snow, and when the latter does fall, it remains but a short time on the ground. To this absence of extremes and of sudden variations of temperature, together with the want of high hills, may be attributed the comparatively small rainfall of Shetland in spite of its insular position.

The following are the average amounts of rainfall for each month of the year, for 13 years, as noted on the east of Yell, 160 feet above the sea, and for 22 years at Bressay, on the east coast, 10 feet above sea-level:—

	East Yell, 160 feet.	Bressay, 10 feet.
January,	5·57	4·36
February,	4·95	3 27
March,	4·56	2·87
April,	2·95	2·33
May,	2·43	1·82
June,	2·03	1·65
July,	2·13	2·40
August,	3·44	3·03
September,	3·46	2·96
October,	6·33	4·71
November,	5·12	3·85
December,	6·46	4·46
Year,	49·43	37·71

As the place of observation in Yell is probably one of the wettest, and that of Bressay one of the driest in Shetland, the mean of the two may be taken as fairly representative of the rainfall of the islands, which would thus amount to 43° 57′.

This is much in excess of the east coast of Orkney, where 34° 37′ is returned as the rainfall at Kirkwall, and 30° 79″ at Balfour Castle in Shapinshay. It is, however, far below the rainfall of many parts of the west of Scotland, and is nearly similar to that of Glasgow and the more level portions of Ayrshire.

In Shetland, as in many other rural districts, the idea is prevalent that in former times the islands contained a much denser population than they do now, and the remains of numerous churches and the frequent traces of habitations are pointed to as indicating that such was the fact. There is, however, no reason to suppose that this was actually the case, and, so far as the vestiges of churches or houses are concerned, it must be remembered that in Roman Catholic times small chapels were thickly scattered over the country, whilst the rude mud-built huts of the peasantry were quickly erected and carelessly abandoned.

Dating from the commencement of the present century, we find from the census tables that, unlike most other rural districts, the population of Shetland has continuously increased, the number having gradually progressed from 22,379 in 1801 to 31,670 in 1861. The return for 1871 did indeed show the slight decline of 62 persons, the population at the last decimal period being 31,608. At that date, however, the male inhabitants had increased since 1861 by 50, whilst the number of females had decreased by 112. This is so far fortunate, as the marked feature in the population of Shetland is the enormous disproportion of the sexes. Whilst, taking Scotland as a whole, we find the number of the females exceeds the males by 9·6 per cent., in Shetland the excess reaches the extraordinary amount of 41·2 per cent. It would appear from this that emigration finds less favour with the women than with the men of the islands, most of whom being more or less sailors, are inclined to seek their future "seaward o'er the world." This continued maintenance of the numbers of the islanders is calculated to excite surprise, and nowhere more than in Shetland itself, as so many of the youth of both sexes are constantly to be seen leaving Lerwick by the steamers to try their fortunes elsewhere. Orkney, too, in many respects so similar, yet so superior in natural resources, exhibits the same features as other rural districts, having diminished in population during the last ten years by 1121, and now contains fewer inhabitants than Shetland. As regards the proportion of persons to the square miles of counties, Shetland and Orkney (which are returned together) contain 67·22, which is almost identical with Dumfriesshire. While thirty of the Shetland islands are inhabited, the great majority of the people reside in Mainland, the largest of the group, some of the smaller isles containing a single family only.

The following table has been arranged to show the number of persons in each island:—

1. Mainland,	21,698
2. Unst,	2,768
3. Yell,	2,732
4. Bressay,	878
5. Whalsay,	854
6. Fetlar,	517
7. Burra West,	442
8. Papa Stour,	351
9. Foula,	257
10. Burra East,	239
11. Fair Isle,	226
12. Muckle Roe,	216
13. Trondra,	126
14. Housie Skerries,	71
15. Brurie Skerries,	43
16. Hevera,	32
17. Oxna,	29
18. Noss,	24
19. Papa,	20
20. Gruna Skerries,	19
21. Linga,	12
22. Vaila,	11
23. Lingu (Walls).	10
24. Uyea,	9
25. Fonga,	7
26. Holm,	5
27. Hascussay,	4
28. Hildesay,	3
29. Muckle Flugga,	3
30. Bound Skerries,	2

One island, Little Roe, was uninhabited in 1871, whilst in 1861 it contained 16 persons. A misunderstanding with the proprietor led to its evacuation, and it is now kept as a special pasture for rams.

On the other hand, Hascussay now boasts of four residents, whilst in 1861 it was uninhabited.

From the above table it will be seen that the population of Shetland is in one sense less insular than that of Orkney; that is to say, the great majority reside in the chief island, and of the total number (31,608), 27,198 dwell in Mainland, Yell, and Unst.

Lerwick, the county town, contains 3516 inhabitants, being an increase of 400 during the last ten years. It is situated on the east side of Mainland, having for its port the noble harbour of Bressay Sound, and is lively and bustling for its size, being the focus of the whole commercial life of the islands. In all other parts of Scotland, with the exception of mineral districts, the rural populations are chiefly occupied in agriculture, but in Shetland it is not so, the cultivation of the fields being subordinate to the harvests of the sea.

Almost without exception the whole male population is more or less engaged in fishing, whilst many of the women for a portion of the year find employment in preparing the fish for export. On the other hand, every man in Shetland is to some extent a farmer, but the result of following two occupations is, that neither can be done perfectly; and of the two, the cultivation of the soil is by far the more imperfect.

The dwellings of the people still remain in their primitive simplicity and apparent discomfort. The plan of the crofters or small farmers' houses is almost uniform, consisting, with his byre and barn, of two oblong buildings parallel with, and attached to, each other. The entrance to the dwelling-house is generally through the byre. Having reached the former, the visitor finds himself in an apartment dimly lighted by a small window and by the opening in the roof which forms the chimney, for the fire is generally in the middle of the room. "Peat-reek" fills the chamber and affects the visitor's eyes. The beds are of the old "box" description, and are generally shrouded in the darkness at one end of the room. Round the chamber are ranged chests on which the family sit, though there is in addition a sort of wooden sofa, which is considered the place of honour, and is always offered to a stranger. The chests contain the valuables, the clothes (and, as regards the women, their Sunday attire is a gay one), and, singularly enough, the milk and butter of the dairy. Never, perhaps, did the owners of cows place their produce in a more unsuitable position. Dogs, pigs, poultry, and perhaps a calf, with multitudinous children, scatter themselves on the floor around the fire, which blazes in the centre. Altogether the scene presented by a Shetland house is strange, confused, dark, and chaotic, a sort of jumbled-up Noah's Ark, built of rough stone and clay. The rude four walls which form the building are covered with turf or thatch in the most unskilful manner, the straw being held on by stones, interwoven in a network of ropes. The eaves, strange to say, do not project over the walls, but terminate at their centres; and thus there is no clear watershed, the rainfall being deposited upon the top of the surrounding walls.

"As might be expected," says the latest census, "Shetland has, of all the counties, the highest proportion of her population living in houses of one or two rooms, with or without windows, 90·24 per cent. of her people being in that condition; and she has also the highest proportion of her population living in huts or houses without windows, seeing that 8·35 per cent. of her families are in that position." And the compilers of the census remark upon these facts as follows:—"So many crude and unsupported theories are now brought forward and proclaimed as facts, that it seems right to mention, that the mere circumstance of Shetland being the worst housed of all the counties of Scotland has not had the effect of either making her the most unhealthy or the most immoral of the counties. So much is this the reverse of being the case, that she stands pre-eminent for the healthiness of her population, and also for their morality, which leads us to conclude that house accommodation is only one of the causes, and, after all, not one of the most important, which affect the healthiness and morality of the people."

This statement seems to us calculated to mislead, and also to be unfair, to those persons who are endeavouring to improve the dwellings of the people. There is really no comparison between a single room in a town or village, crowded with lodgers of both sexes, who are often strangers to each other, and a house in Shetland, though consisting of but one apartment, and containing, it may be, as many human beings. In Shetland all the surroundings are healthful; the open plain is at the door, the sea is close at hand, and the sky is unobstructed, whilst the room itself is generally a very large one. Then, save when sleeping or at meals, the islanders may be said to spend their lives in the open air. They are warmly clad and well fed, the dietary of the Shetlanders being undoubtedly the best of any peasant in Europe. With more animal food than is obtained farther south, he has, besides potatoes and home-baken "scones" of various kinds, an unlimited supply of fish; and in place of beer, his drink is *bland*, a beverage made of whey scalded with hot water and then allowed to become acid. With all this, a very large, and, as regards the pocket, a too large quantity of tea is consumed; and it may be added, that if the fuel is of inferior quality, it is abundant in almost every quarter. These material comforts must surely count for much in regard to the health of a population, whilst, as regards morality, it must not be forgotten that in Shetland the paternal system remains in all its beneficent integrity. If the houses consist of but one chamber, their too numerous inhabitants are at least all of one family, though three generations may be represented. Thus most of the real evils of small and crowded houses are awanting in Shetland; but at the same time it is undoubtedly true, that civilisation, comfort, and decency, all require that these old island dwellings should give place to buildings more in accordance with modern ideas and modern requirements.

These farmer-fishermen hold their crofts from the proprietors as year to year tenants. They do not like the idea of leases, and much discontent has been caused by some landowners insisting on granting leases, though their object in so doing was to benefit the tenants quite as much as themselves.

The cultivated land is rented at about L.1 per acre. This would of course be a high rent for such a place as Shetland, if the use of the one acre of land was all that the tenant had in return for his twenty shillings; but that is far from being the case, as his occupation of the croft carries with it an almost unlimited right of grazing on the scathold or unenclosed pasture and hill lands. The holdings, so far as the enclosed portion of the crofter's land is concerned, may be estimated as averaging from three to five acres, and the whole circumstances connected with it, its arrangement and management, are exceeding similar, in fact almost identical, with what obtained in Scotland about two centuries ago. To visit a Shetland croft, and observe its economy, is to see in actual practice what we read of in pages devoted to antiquarian agricultural research. Whether the crofter's house stands alone, or, as is usually the case, forms one of a little group of dwellings, the small cluster of buildings is called a "town" or "toon," and the general aspect of the place, and the farming arrangements, are almost in every instance nearly identical. On appoaching the farms from the sea (still the chief highway in most parts of Shetland), the houses are found to be scattered along some grassy bank, a patch of pasture or meadow land intervening between them and the shore.

The lands are managed as in days of yore on the old infield and outfield plan, and the former was at no remote date still cultivated on the run-rig system, and in some places this primitive and most objectionable mode of arranging land still subsists in Shetland. The only explanation that can be suggested for this ancient and seemingly absurd system is, that it was thought that, by interlacing numerous patches of land, allotting alternate ridges to different crofters, they might be more mutually interested in defending their common holding from the incursions of marauders, whether these were men or animals.

At the present day this arrangement seems to involve every possible inconvenience and disadvantage, without one single compensating benefit. A surrounding wall, generally an irregular and rudely constructed mound of turf, enclosed the whole cultivated soil, together with a portion of land in natural grass, which is common to the crofters. On this pasture their cows are tethered in summer, but in autumn, when the crops are carried, the cattle roam at pleasure over the whole enclosure. So careless are the Shetlanders of turf, that in place of digging a trench along the line when the surrounding wall is to be formed, and thus strengthening the fence by making it consist of a ditch and wall combined, we have frequently observed the turf taken wherever it was freshest and best, inside as well as outside the enclosure, the whole surrounding surface being thus cut up and disfigured. But this carelessness of turf, when wishing to form a wall, is of very trifling consequence when compared with a system of farming which involves the total destruction of large portions of the islands, in order to enrich the small patches under cultivation.

Beyond the enclosures, wherever a patch of good turf can be found, it is dug up in the most reckless and ruthless manner, and carried off to form manure for the "infield." Astonishing as it may seem, this ruinous system almost universally prevails, and few proprietors make any vigorous or systematic efforts to check it. Some indeed do, and Major Cameron, and his active agent, Mr Walker, have in Bressay and other islands been subjected to much obloquy, and have been involved in many disputes, from their determination to put a stop to the destructive process upon the major's estates. The turf and soil thus shamefully dug up is carried to the homestead by ponies, or more commonly by women in their "*casies*" or creels, and being mixed with heather, or any wild herbage that can be procured, is used as litter in the byres.

We may remark, in passing, that the heather in Shetland presents generally a withered and stunted appearance. This is partly caused by its being cut while in bloom. to be used with the soil for litter. Layer follows layer of these materials till the byre can hold no more, when the compost is removed and applied to the surface of the soil as manure. Thus whole districts of the country are frightfully disfigured by being cut into pits in which water collects; whilst in other places the rock is laid bare, "scalped," as it is called, large tracts of land being absolutely removed, and the surface rendered permanently useless. Were a slice of an island every year blown up by gunpowder and thrown into the sea, the proprietor would probably some day wake up to the knowledge that his property was disappearing, yet the "scalping" system excites little remonstrance, though it is as surely destructive as the taking a slice from the circumference of the island would be. Thus, to complete the picture of the crofter's home and its surroundings, we have a zone of land between the turf wall and the hill, the whole surface of which is broken up and destroyed. Farther off in the scathold, the usual peat diggings are to be seen, with little stacks of fuel piled up, which the women ultimately carry home in their casies.

Here and there on the hill sides may be observed small circular enclosures of stone, reminding one of the screens built in mineral districts to guard the mouths of abandoned coal mines. These are called *plantic-cruives,* and are nurseries for young cabbage plants, which the Shetlander uses largely for domestic purposes, though he does not cultivate it for his stock.

As in the arrangement of the crofts, so in the mode of cultivation, the system pursued is that exhaustive one which was universal in Scotland, till modern science showed that if land was to continue productive, it must be fed as well as bled—that some equivalent must be given for the produce carried off. Portions of the infield are indeed manured at the ruinous cost above described, but as regards the outfield, oat crop succeeds oat crop till the soil is reduced to sterility, when it is left to the slowly restorative process of nature.

Where any systematic rotation is carried out, the infield, which is turned over every year, may be said to be cropped in the following order:—1st year, potatoes; 2d year, oats or bere; 3d year, oats; 4th year, grass; 5th year, potatoes.

The species of oat universally sown by the crofters is the grey Shetland oat, and it is no doubt better adapted to the situation and climate than some of the more delicate varieties, though it is not very prolific, and its weight does not exceed 20 lbs. per bushel. The straw is dark-coloured, and is much prized by the islanders as fodder, though not equal in quality to the better descriptions grown in Scotland.

No barley in the strict sense of the term is grown, its place being supplied by the hardier variety called bere. This is a four-eared grain, which may be said to produce 32 or 33 bushels per imperial acre, weighing about 49 lbs. to 52 lbs. per bushel, but it is almost impossible to extract any definite reply from a Shetland crofter, when asked what return per acre his holding produces, and these figures are estimates only. The whole straw produced on the croft is consumed as fodder, being too precious to be used as bedding and trampled down into manure, an arrangement that would please the indefatigable Mr Mechi.

The chief defect of the climate of Shetland being the tardiness of its spring, "voar" or seed-time does not begin till April, oats being sown in the beginning of the month, whilst potatoes are planted and bere sown early in May. Bere ripens more quickly than oats, and in favourable seasons is ready for the sickle early in September, oats not being cut till the end of the month. The great risk which corn crops run in Shetland takes place in summer at the period when the grain is approaching maturity. At this season the crop is exposed to a calamity unknown in more favoured localities. A blighting wind storm, charged with sea-spray, too often drives across the country, bleaching, whitening, and shrivelling up the whole plant, and utterly destroying its productiveness. Great loss and much misery is often caused by these destructive "sea-gusts," as they are called.

A large proportion of the whole operations of agriculture is performed by the women, and the amount and the nature of some of the work done by females is perhaps a proof that Shetland is not quite abreast with Scotland as regards civilisation. Fishing being the chief object of the men, they are frequently absent to the injury of their agriculture, and from this cause harvest operations are often unduly delayed, the men not having returned from the deep-sea fishing till the corn has become over ripe.

The large amount of rain which falls in the autumn months renders the harvesting of the crop a matter of much anxiety, as well as difficulty, and the mode in which the corn is managed after being reaped might be copied with advantage elsewhere in wet seasons. Soon after being cut, and long before the sheaves could be safely made into large stacks, they are "*skrewed*," as it is called, that is, about a couple of cart-loads are made into small ricks with a good watershed, and after standing a sufficient time, they are removed and thrown together into stacks of a larger size. The corn is threshed by the flail, and is either ground by a small water-mill peculiar to Shetland, or by hand-querns, as was the case elsewhere in days of old. The grain produce of the farm is all used for home consumption.

As regards agricultural implements, those of the crofter are few and simple. Formerly, what was called the Shetland plough was universal. It had a single stilt, and was constructed entirely of wood, chiefly boughs of trees having natural curves which suited the primitive nature of the implement. When these were in use, the crofter's holding was generally larger than it is at the present day, the policy of the land-owners being to reduce the size of the crofts in order to increase the population, and thus secure a sufficient supply of fishermen, the landlord being generally a partner with his tenants in this, the staple industry.

The present race of crofters have discontinued the use of the plough, and have replaced it by the spade.*

The cultivated land being almost always on an incline rising from the sea, is generally turned in rows, beginning at the top, and thus there is a constant tendency to throw the soil from the higher to the lower end of the plot.

As regards live stock, the crofters possess ponies, cattle, sheep, and pigs. The pony of Shetland is a characteristic little animal, and its appearance and qualities are too well known in the south to require any special description. About ten or eleven hands high, hardy and well made, it is capable of much more work than its appearance would indicate. Shaggy and unkempt in its native wilds, it becomes a beautiful little creature when carefully tended as the pet of children in southern districts. A vast number of these small "horses" are, however, not so fortunate as to secure so happy a fate, numbers of the males being sent to the mining districts, where their lives are spent in the coal pits. The ponies now command prices very greatly in excess of what they did twenty-five years ago, mares fetching from L.4 to L.5, whilst geldings, from the special demand for them, bring double these sums. Agents regularly traverse the islands, and eagerly buy up every pony that can be got; and the supply not nearly equalling the demand, Faroe and Iceland are now annually visited for the same purpose, though the ponies there are far inferior to those of Shetland. In spite of this demand, and great rise in value, the breeding of ponies is rapidly declining, as it is found they do not pay so well as cattle; and this in spite of the further fact, that they require less care, as they are never housed in winter, but, with the sheep, are left to take care of themselves in the open fields. The fact that one foal can only be reckoned on in two years, together with the high price of beef, combine to turn the breeders' attention more to the ox than the pony. The ponies, too, are deteriorating in quality, the best being always sold off, no attention being paid to securing superior specimens, male or female, for breeding purposes.

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* Most Shetlanders will be surprised to learn that in one instance, at least, the original Shetland plough is still in use.

As regards cattle, ten animals of all ages may be taken as the ordinary stock of the crofter. The whole of these are housed in winter during the night, when the turf of which the pastures have been robbed is made into manure, the animals being turned out during the day to roam where they feel inclined, either within or without the inclosure. The Shetlander has an abundance of milk, but no dairy; and we have already alluded to the singular substitute he has adopted in its place, viz., some of the chests which are arranged around his dwelling-room, and which serve at the same time as a substitute for chairs. In autumn one of his small oxen, weighing about 2½ cwt. dead weight, is killed and salted for winter use. This is done either by the crofter himself or in conjunction with a neighbour,—two families sharing the expense, and dividing the animal between them. The ordinary crofter sells on an average only two small oxen each year, and does not receive for them more than from 50s. to 60s.; but in Unst, where alone there is some improvement in the crofter's mode of farming, and where good bulls are used, yearling cattle fetch from L.5 to L.7 each.

The native Shetland sheep is quite a peculiar feature in the landscape, and bears almost as small a resemblance to a heavy Leicester as a Shetland pony does to a Clydesdale horse. With limbs slight even in proportion to their bulk, the whole animal does not average more than seventy pounds live weight, and when fat weighs about eight pounds per quarter. The wool varies much in colour,—a dull grey being the most prevalent. There are also many black sheep, whilst some are of a peculiar reddish brown. This last description is called "*murid*," and is much prized as being best adapted for some of the fancy hosiery into which so much of the Shetland wool is converted. The sheep are not shorn, but are "*rued*," as it is termed, the scanty fleece being torn off with the hand. This rather cruel practice is caused by the belief, that when the wool is thus removed the succeeding crop is of a finer quality than when the sheep have been shorn in the usual manner. The ordinary weight of a fleece is not more than from 1 lb. to 1¼ lb., and the whole crop is used by the inhabitants, being converted into worsted work, chiefly by the women, though a few hand-looms are still in use for the manufacture of flannel cloth.

The amount of worsted work done by the women of Shetland is remarkable, as their fingers seem never to be idle, and whether bringing turf in their "*casies*" from the hills, or carrying farm produce to the markets, they are constantly to be seen deftly using their knitting needles.*

The number of sheep kept by each crofter is very various, and is in no way regulated by the extent of his holding, as he may put as many animals upon the scathold as he chooses. The sheep of the whole district are mixed up and browse together, the owners knowing their own by marks on each individual; and whenever a crofter wishes to catch a sheep, the whole flock is hunted and driven by a multitude of dogs, each householder keeping a number of useless curs, their food costing little, as it consists largely of the offal of fish. The recent excise law introduced by Mr Lowe had a beneficent effect in Shetland at least, as it diminished the number of so-called shepherd's dogs, a general drowning having taken place when the first payment of the tax came to be enforced. The Shetland sheep is similar in character to breeds which once ran wild in the more northern regions of Europe, and is perhaps better adapted than any other for the state of utter neglect and the miserable pastures in which it is kept.

Shetland has hitherto been totally exempt from all the evils of the epidemic diseases which, during the last quarter of a century, have upset the calculations and diminished the profits of southern stock-owners. Not only did the terrible rinderpest never reach the islands, but pleuro-pneumonia and murrain are happily unknown, and thus one great cause of anxiety and loss to the farmer does not exist. The sheep, however, are terribly afflicted, and their value deteriorated, by scab. This abominable disease is said to have been introduced by some rams brought from Scotland in 1780; and from what has already been said, as to the sheep of the various owners being grazed together, as well as the absence of all proper supervision, it may be well imagined what havoc scab must cause. At various periods this filthy malady has far more than decimated the native flocks of Shetland, and it is recorded that in some parts of Mainland not less than two-thirds of the total number of sheep were destroyed soon after its introduction. No attempt is ever made by the crofters to introduce any modern breed of sheep or to improve the existing one. On the contrary, as is the case in other descriptions of stock as well as sheep, the tendency is towards deterioration, as the best animals are always sold off, in total disregard of all breeding considerations.

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* The wool of the blackfaced sheep is all sent south, and on the other hand some fine wools are now imported by the Shetlanders to be converted into hosiery, and then sent to southern markets, where it is no doubt purchased as the product of the islands.

The law of steelbow, as it is still found in operation on some estates in Shetland, is a complete hindrance to any improvement. As regards farm produce it has fallen into disuse, but in some instances it still holds the place it did in respect of implements and live stock as at the remote period of its original institution. By this arrangement, so out of keeping with modern times, the tenant at the end of a lease has to hand over his live stock to the landlord; and, as there is no sort of tenant-right or payment for improvement, it is clearly not the tenant's interest to improve his stock, as the whole advantage of so doing would remain with the landlord. There is a farm close to Lerwick called Grimstu, belonging to Lady Nicholson, which is let on these extraordinary terms, and the stock must ultimately be handed over to the owner of the land, irrespective of any increased value it may have obtained.

From the account which we have thus endeavoured to give of the Shetland crofter-farmer, it will be perceived that the difficulties and hindrances in the way of improvement are numerous, serious, and special to the islands. The habits of the people, their insular position, and the long-established usages of the country, combine to exclude new ideas and to perpetuate old ones. The men exhibit in their character at once Celtic hardihood and Celtic laziness; as fishermen, they are fearless and active, but the toils of the sea being over, they are content to be negligent husbandmen. It must be admitted, too, that in Shetland proof of imperfect civilisation is exhibited by the undue share of labour which is borne by the women, who are the real cultivators of the land. "But it is the women who do the work" was the final reply we once received when endeavouring to show the folly and waste of manuring the land through the "scalping" process. Having told a group of crofters that better manure could be bought in a portable shape, that the crops would be more improved, whilst the commons would not be destroyed, and that the huge whale-bones scattered about, and the much larger bulk of fish-offal annually thrown into the sea, would make, with a little trouble, better manure than the transported soil, the first reply we received was, that manure brought by sea cost money, while the soil was got for nothing. "But," we argued, "it is not got for nothing, it requires much time and labour to procure it;" and then we were answered as above, "It is only the women who do the work."

The whole crofter's land in Shetland would be immensely improved by the application of lime, and this mineral is worked to a greater or less extent in some seven or eight places in Mainland, but it is never used by the smaller farmers, whilst some of the larger ones find it cheaper to bring it from Scotland to their farms. The price at the kilns in Shetland is high, being from 12s. to 14s. per ton, and the difficulties of carriage being great, it is found cheaper to use sea-borne lime. Then, the example of improvement, in agriculture so specially superior to precept, comes in Shetland from what, we regret to say, are the distrusted and disliked, if not absolutely hated, Scottish settlers.

As an example, though no doubt an extreme one, of this feeling, we may instance a conversation we once held with a tall, gaunt, weird-like, old female pauper, who yet had traces in her person and blazing black eyes of having once been a fine-looking woman. We had entered into casual conversation with her as she stood at the door of her wretched cabin. At first we were surprised by her short, curt, angry questions and replies (and we may say in passing that curiosity is a marked feature in the Shetlander's character, and a stranger is often closely catechised), when all at once there came a gush of explanation and apology. We were suddenly addressed in terms of endearment. She had mistaken us for a neighbouring settler who had supplanted several native husbandmen. "See," she said, stretching out her long thin arm, "there I once had a cottage, and a bit of ground, and some sheep; but a Scotchman came and took all, and here I am with nothing left to hope for but that churchyard yonder; it is the only ground the Scotchmen cannot take from me!" On another occasion, when visiting a remote island in company with one of the best known of these improvers from the south, he was suddenly mobbed by the natives when about to take boat, and for some minutes things looked really dangerous. The people had erroneously imagined that he had visited the island with a view to becoming its tenant.

Whether, therefore, we look to the character of the people, or to the land usages of the islands, we find some features common to Ireland, and also, though in a less degree, to the Highlands of Scotland. The Shetlander, like the Irishman, looks upon settlers from Britain with jealousy and suspicion, and, in common with both the native of Ireland and of the Highlands, has small inclination for hard labour and continuous toil. Yet has the Shetlander two great advantages,—one over the Celt of the Green Isle, and the other over the Scottish Highlander. He speaks the same language and worships at the same altar as his British fellow-subjects, and thus has not to contend with the evils of owning a hostile creed, or of using a local, if not obsolete language.

In any general survey of the agriculture of Shetland, as practised by the smaller farmers, the peculiar position of the islands as regards the truck system must never be lost sight of. That system pervades every relation of life between landlord and tenant, and, more than all other causes put together, tends to stereotype, as it were, the habits and customs of the people, to retard improvement, and put a stop to enterprise.

We have already alluded to the fact that steelbow in live stock still exists in Shetland, and it seems to us that in its origin the truck system is only "steelbow" in another form; we may call it the "steelbow of the sea." We imagine that the owners of the soil said to their retainers something like this, "If you will fish for us, we will supply you with the implements for so doing; you will give the skill and labour, and we shall share the profits between us."

In pursuance of this arrangement boats and nets were lent to the fishermen, and some were also allowed to become yearly tenants of crofts at lower rents than the land would have let for in ordinary circumstances. Money is also advanced to the men to purchase provisions, and for other necessary expenses. From this arrangement it will be seen that the men start with a debt due to their landlords, and, as a matter of fact, it is found impossible ever to become free of it. In return for the loans received, the fish must be sold to the proprietor; and there being no competition, prices are in a great measure fixed by the purchaser.

But the owner of the land, besides being a dealer in fish, in most cases becomes also a general merchant, and deals in all the articles in daily use in the crofter's household, whom he takes bound to buy only at the landlord's store. The hosiery work, too, of the women of the crofter's family has to be brought to the same market, and is generally bartered for the tea, the sugar, the wearing apparel, and other articles required by the crofter. A tenant helplessly in debt, holding his croft from year to year, and knowing that any improvement in the land might be taken advantage of by the proprietor as a reason for increasing the rent, is not likely to be an enterprising farmer. Yet the crofter objects altogether to accept a lease, even in the few instances where it is offered to him. He seems to dread it as an instrument which would compel him to forego "scalping," and to force him to conduct his business in a manner different from his wont or the practice of his fathers. The complex nature of the relations which exist between landlord and tenant have also one effect similar to a long lease,—they almost insure fixity of tenure. The tenants are tied to the soil by the weight of their debts.

A royal commission has recently investigated the matter of truck in Shetland, and has heard a vast amount of conflicting evidence, the system being as keenly defended as it is warmly denounced. The report, which is looked forward to with much interest, has not yet been published, and we can only hope that it may point out some means by which this old-established but mischievous system may be largely modified, and ultimately entirely abolished.

Having thus endeavoured to describe the peculiar position of the native agriculture of Shetland, we proceed to notice what may be called the imported husbandry of the settlers from Scotland, as well as the equally good management of several of the hereditary proprietors who farm portions of their own estates.

The number of persons who have thus chosen the northern islands for the sphere of their labours and enterprise is not large; still, there are few districts of the county which cannot boast of one or more farms upon which capital has been skilfully and successfully expended.

As we purpose, before concluding this paper, to make what may be called an itinerary, or short survey of each individual island, we shall, when doing so, give a brief notice of most of these gentlemen farmers, and for the present we shall only give a general idea of their mode of farming. The farms are for the most part of considerable size, and, as may be supposed, in laying them out, some of the crofts were necessarily interfered with, and hence one chief cause of the jealousy with which the Scotch farmers are regarded in the islands. Farm-houses and steadings suitable to the occupancies have been built, around which a portion of land under tillage has been laid out and divided into fields by fences of stone or turf walls. The chief portion of the farms, however, consists of pasturage, and the whole occupancy is surrounded by fences where natural boundaries do not exist. As may be supposed, the farmers in no case avail themselves of the right of scathold pasturage; but the frequent trespassings, particularly during the night, of the scathold sheep within the enclosures is a fertile cause of dispute between the farmers and the crofters. As regards tillage and the cultivation of crops, the Scotch farmers have carried into Shetland the whole system of agriculture as practised in Scotland, modified only, as regards crops, by a few changes rendered necessary by the situation and climate.

As may be imagined, no attempt to grow wheat is ever made, former experiments having fully proved that it cannot be brought to maturity in the islands. The late venerable minister of Tingwall, a keen and skilful agriculturist, gave wheat a fair trial in his parish, which contains some of the best land in Shetland. He thought that perhaps the long sunlight of summer might compensate in some degree for the want of warmth, but though the crops grew vigorously and produced abundant straw, the grain failed to ripen. It is now well known that the wheat plant requires an aggregate heat of 82·48°, an amount of warmth which it does not obtain in Shetland.

Barley, though requiring less solar heat than wheat, cannot be profitably grown, and the Scotch farmers, like the crofters, cultivate bere in its place; but, as regards oats, they have neglected the grey native plant and grow finer varieties, chiefly that called "sandy," which is the least liable to be shaken. These oats succeed very fairly, and are more profitable than the native variety, though the crofters cannot be induced to try them. The straw makes better fodder, and, as regards grain, the produce may be estimated as averaging 35 to 45 bushels per acre, and weighs 40 lbs. per bushel.

Turnips, the cultivation of which as a field crop is confined exclusively to the larger farms, is on the whole so limited that 456 acres is the total amount grown in the islands, as shown by the latest agricultural statistics. The small extent to which turnip culture is practised, in a country where there are such large numbers of cattle and sheep, is surprising, as the climate and a considerable portion of the soil are not unfavourable to their growth, and they are free from several of the ills to which they are liable farther south. They are not subject to want of braird in spring, or to mildew in summer from the effects of droughts, and the turnip-beetle, which so frequently destroys whole fields in the south, is happily not to be found in Shetland.* The wood pigeon, too, which in many parts of Scotland frequently does serious damage to a newly-singled field of turnips, is unknown in the islands; but, on the other hand, turnip growers in Shetland have some feathered foes to contend with which commit no ravages in the south. The chief of these is the twite, a mountain linnet, which alights in vast flocks on the fields, and often greatly injures the young crop when still in the cotyledonary leaf. The larger sea-gulls, too, of which there are great numbers, frequently break into the bulbs with their powerful bills, but this only occurs in winter, when the farmer has left his crop exposed too long in the fields. These gulls far more than repay any partial damage they may do to the turnip crop by destroying uncounted numbers of that insect pest of the farm, the grub of the crane-fly (*Tipula olerica*). A far deadlier enemy of the turnip crop than any living foe has, however, appeared in Shetland in the form of "finger-and-toe." This mysterious disease has recently attacked the plant with such virulence as to cause several of the most enterprising farmers to abandon, for the present at least, all attempts to continue the cultivation of the turnip.

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* Many Shetland farmers assert that the turnip "fly" (*Altica nemorum*) is to be found in the islands, but there is no doubt they mistake it for a harmless though closely-allied beetle.

Writing upwards of sixty years ago, Dr Edmondston, the able author of "A View of the Zetland Islands," discusses the question whether tillage or the rearing of stock was likely to be the most beneficial to Shetland and profitable to the farmer. At that period the only attempt to grow turnips had been made by the enterprising minister of Tingwall, Mr Turnbull; and as corn crops were so often destroyed by the sea blasts in summer, it was urged by many that the entire attention of the farmers should be devoted to the breeding of live stock,—ponies, cattle, and sheep. But Dr Edmondston argued strongly, and with undoubted force, against turning the islands wholly into pasturage; and nothing proves more clearly the vast and beneficial change which has taken place in the outward circumstances of Shetland, and its relations to other districts, than a glance at the arguments used by Dr Edmondston. Having said that large sheep farms would tend to drive out the crofters and therefore depopulate the country, and having also referred to the frequent and terrible losses caused by the prevalence of scab, which he declares "so thinned the country of sheep that there is not one left in fifty of the number that was a few years ago," he rests his main argument on the almost total want of a market, either for live stock or for butcher meat. In spite of the terrible havoc which the scab had recently caused, mutton had not risen above 2d. to 3d. per pound. When ships of war put into Bressay Sound, all provisions, mutton included, were raised in price, but at other times there was no demand whatever. "Sheep," says Dr Edmondston, "could not be sent alive out of the country but at an expense which the trade could not support, and there is no mode of curing animal food so as to make it keep." Wool, also, when sent to Leith, sold at a low rate. The demand, too, for Shetland hosiery had at that time become greatly less, L.5000 worth only being exported, in place of L.17,000 twelve years before. How different is now the position of Shetland as regards a market for every description of its live stock, its cattle being eagerly bought up, its ponies sought after almost to extermination, and the yearly produce of its improved flocks of sheep being regularly placed in the markets of the south, almost as easily as those reared in the neighbourhood of the great centres of consumption. Nowhere has the introduction and regular service of steam-ships made a greater revolution than in Shetland, where weekly and bi-weekly sailings to Aberdeen and Edinburgh bring the northern flock-master within reach of the markets of these cities. Until lately traffic between the various islands in Shetland, as well as in the transit of merchandise to and from Lerwick, was carried on entirely by sailing vessels, but a steam-boat now regularly trades among the islands.

As regards inland communication, Shetland has for the last twenty-five years enjoyed the advantage of good roads, of which the islands were formerly destitute. This great advantage sprang, like many other good things, out of evil, as Shetland owes its roads to the misery caused by the failure of the potato, when the fatal disease first spread so much distress over Great Britain and Ireland. Shetland suffered at this period in a special degree, as the fishing was also a very bad one, and Government, in order to find employment for the people, wisely planned and executed a great public benefit, making highways through the larger islands. These now traverse the whole of Mainland from north to south, and also in several districts from east to west, whilst there are also roads in Yell and Unst. These highways are maintained by a rate, which varies from 6d. to 1s. 6d. in the pound, half being paid by the owner and half by the occupier, the whole being levied in the first instance upon the proprietor. Thus, in respect of there being no turnpikes in Shetland, that remote county is in advance of many which can boast of being much more favourably situated.

Under these entirely altered circumstances as to the means of transit, and the consequent opening up of markets for the produce of Shetland, it is not to be wondered that its larger farmers make the breeding of stock (principally sheep) their chief object, their limited amount of tillage being entirely subordinate to their flocks and herds. Until lately the Cheviot breed of sheep was that which was most used by the Scotch farmers, but a change has recently begun, and is now in rapid progress, by which the blackfaced is supplanting the Cheviot on the Shetland pastures, the hardier variety of sheep being well suited to the northern climate.

As regards cattle, shorthorn and other improved breeds are used, and several high-class shorthorn bulls have been introduced.

Little attention is paid by the farmers to the breeding of ponies, because, as previously stated, in spite of the high prices which these animals now command, cattle and sheep give quicker returns, and consequently pay better.

Regarded as a Scottish county, Shetland is no doubt the last, as it is the most remote, that a stranger would choose for his home, in so far as many of the amenities of life are concerned;

but viewed in the light of a colony, or as a sphere for active exertion, offering a fair prospect of pecuniary remuneration, together with a safe and healthy life, Shetland may compete with any quarter of the globe as an opening for a sheep farmer. The pastures are sound and healthy, and produce excellent beef and mutton; and the rent of land has not risen at all in proportion to what it has done in Scotland.*

As regards domestic comforts, the regular service of the steamers has in a great measure bridged the sea which separates Shetland from the mainland of Scotland, whilst the electric telegraph, now extended to the islands, cannot fail to obliterate in a great degree the feeling of isolation from the rest of the empire. As yet, however, the rates charged for messages are so high as to be almost prohibitory.

Finally, if society is limited in numbers, the intercourse between families is cordial and intimate.

We shall now turn from the general survey of Shetland to take a cursory view of each individual island, beginning with the most southern, and proceeding gradually northward.

Fair Isle is situated halfway between Orkney and the main group of Shetland, being about twenty-five miles distant from each. It is a small mountainous island, about two miles in length and one in breadth, composed of sandstone, with a rocky and precipitous coast. It is famous in history as the scene of the wreck of the admiral of the Spanish Armada, the Duke of Medina Sidonia, who, with his crew, remained in the island as long as food could be procured, and it is affirmed that traces of this occupation may be seen in the appearance of some of the islanders at the present day. Fair Isle is chiefly valuable as a fishing station. The crofters are the only farmers, and their agriculture is of the worst description, "scalping" being carried on to a large extent. The island was lately purchased for L.3300 by Mr Bruce of Sumburgh, and as copper has been recently discovered and mining operations begun, the investment may ultimately turn out to be a profitable one. Proceeding northward we pass the "*roost*," the stormy tide-way which sweeps round the long peninsula forming the southern extremity of Mainland, and are confronted by the towering ocean precipices of Sumburgh and Fitful Head, which Sir Walter Scott has made famous in "The Pirate."

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* As an illustration of what is still within the reach of a sheep farmer, we may mention the case of Vemenstry, an uninhabited island in St Magnus Bay, which, while we write, is advertised to be let. It carries about 300 Cheviot ewes, and the present rent is only L.10. It may also not be out of place to remark that as there is no game in Shetland, that too frequent cause of discomfort between landlord and tenant does not exist. Some attempts have been made to introduce partridges and grouse, but hitherto without success, the stunted and unhealthy condition of the heather being no doubt a chief cause of the failure of the latter. A few hares are to be found in some parts of Mainland, the result of recent importation from Scotland. Snipe are found in great abundance, and quite a traffic is carried on in their eggs, which are gathered and sold to egg collectors. Rabbits are only too abundant in some localities, but in general they are confined to the link lands near the sea, and to some of the smaller islands, where, as they readily sell for 1s. each, they are perhaps the most profitable stock that can be kept on the ground.

The long spit of land which forms the southern extremity of Mainland, stretching we may say from Lerwick to Sumburgh Head, is about twenty miles in length, and only from two to three in breadth. Narrow as this stripe is, it is divided geologically from north to south into two equal portions, the western half being claystone slate, while the eastern side is composed of secondary sandstone. There is some good land in this peninsula, and at its southern extremity Mr Bruce, who has recently built a handsome mansion, farms his own property; and there also Mr Grierson of Quendal has, within the last four years, taken a good deal of land into his own occupation. The farm of Bigtown on this estate is well farmed by Mr Budge, who rears high-class lambs, the produce of Cheviot ewes and Leicester rams.. A fine farm on the Symbister estate was many years ago permanently destroyed, by being entirely covered with drifted sand blown over it during wind storms.

Upon the western coast of the peninsula are the two contiguous islands of East and West Burra, important from the amount of their population, as they contain 681 inhabitants. They are the property of Scott of Scalloway, and are farmed by crofters. They are very badly "scalped," and the agriculture is wretched; but the inhabitants are well off, as they subsist by fishing and not by farming.

Immediately opposite Lerwick is the fine island of Bressay, the strait which flows between forming the harbour of the county town. Bressay is the property of Major Cameron, one of the largest proprietors as well as sheep farmers in Shetland. It is here that Mr John Walker, now so well known as farmer and factor, first pitched his tent, which assumed the comfortable shape of the excellent farm-house of Maryfield. Here Mr Walker has a farm, of which 110 acres are under tillage. This land now produces fully fourfold what it did when he first entered on the occupation of it thirteen years ago. Mr Walker grows a small quantity of Swedes, the only instance where that variety of turnip is sown in the islands; and at Maryfield too is to be found the only steam threshing-mill (a fixed machine) in Shetland, water power being the usual mode by which the larger farmers thresh their corn, the crofters using the flail. Mr Walker also farms the small adjacent pastoral island of Noss, so famous for its tremendous ocean precipices, covered in the breeding season by unnumbered sea-fowl. Around these cliffs Mr Walker has had built a long stone wall for the protection of the sheep, which consist of 320 Cheviot ewes, from which half-bred lambs are raised and annually sold off to dealers, or are sent direct to the southern markets. The price realised last season was 34s. While we write, we learn that Mr Walker has sold his right to the lease of the island of Noss and the farm of Maryfield to the Marquis of Londonderry, who intends to devote them to the rearing of ponies, in order to supply in some degree the increasing want of these animals for his coal-pits.

Bressay has had for many years the advantage of having as a resident the able and distinguished clergyman of the parish, the Rev. Dr Hamilton, whose knowledge of farming might be of great benefit to the crofters, if these most *conservative* of farmers could be in any way influenced, either by precept or example. The crofters are the chief occupants of Bressay, and no stronger instance could be adduced of the tenacity with which these fisher-farmers cling to ancient customs than the fact that the most strenuous exertions of both proprietor and factor have been exerted with a view to improve the husbandry of the island, with as yet only indifferent success. In spite of the most stringent prohibitions, "scalping" is still to some extent practised, and here, too, numerous instances of the old "run-rig" system are still to be found. Reversing the usual order of things in Bressay, the proprietor has found almost insuperable difficulties in his endeavours to induce the tenants to accept favourable leases of from ten to nineteen years for their farms. Bressay and Noss are chiefly composed of sandstone, and with these islands terminates that formation, which is almost entirely confined to the south-eastern extremity of the islands. A few miles from Lerwick, on the road to Scalloway, is the farm of Veensgarth, belonging to G. H. Hay, Esq. of Sound, and occupied by Mr George Bruce, one of the leading farmers of Shetland. Mr Bruce's farm consists of about 3000 acres, of which 250 are under cultivation. A first-rate steading has been built, and it is only to be regretted that, considering the climate, the cattle courts are open, and not entirely roofed over. Mr Bruce reared till lately flocks of half-bred lambs, but now has blackfaced ewes and Leicester rams; and the farm was wont to be remarkable for its large fields of thriving turnips, which need scarcely have feared a comparison with their owner's native Aberdeenshire. Latterly, however, we regret to say, finger-and-toe has appeared in a form so virulent as to sweep away almost the entire crop, and even (for the present, at least) to put a stop to the cultivation of the plant. Passing across from Lerwick and Veensgarth to the Atlantic side of Mainland, we reach the estate of Reawick, the property of Andrew Umphrey, Esq., a hereditary Norse-man, whose forefather received as guests the Duke of Medina Sidonia and the remains of his shipwrecked crew, when driven by want of food from Fair Isle. Besides being an enterprising merchant and fish-dealer, Mr Umphrey farms his own property, having taken a portion of the land into cultivation and built a nice farm-steading, cattle in his case receiving a large share of attention.

Some thirty-five miles west of Reawick, amid the waves of the Atlantic, lies the lonely isle of Foula, in many respects the most interesting of the whole archipelago. It may be described as a fivefold mountain rising abruptly from the sea, and terminating in sharply steep cone-shaped peaks. A single landing-place at the fishing station of Ham affords shelter to boats and small craft, the rest of the coast exhibiting a range of the most terribly sublime ocean precipices in Shetland, and second only in Britain, perhaps in the world, to those of the remote island of St Kilda.

Geologically, Foula is almost entirely composed of sandstone; but near Ham, where a whole district of the little island has been laid bare by "scalping," the rock consists of claystone slate. This scene of wanton destruction, like many more legitimate ruins, looks wonderfully beautiful when seen in the silvery moonlight of a clear summer night, bright and glittering as the rock is with the quartz, felspar, and mica which it contains. This island is the property of Dr Scott, R.N., who, after spending much of his life in an honourable public service, has settled down, to the great delight of the inhabitants, on his chief estate, Melby, on the western coast of Mainland. Foula seems to be chiefly valued as a fishing and curing station, and the only agriculture practised in it is that of the Shetlander pure and simple. Yet, in our opinion, it is capable of producing finer crops than any other island in the group. Much of the soil is naturally good, and the climate is manifestly more largely affected by the Gulf Stream than that of any other part of Shetland. Nowhere else have we seen crops of bere, oats, and potatoes grow so luxuriantly; while the natural pasture of the steep but grassy hills is rich and varied in the nature of its component plants. On the other hand, nowhere is the ruinous effects of the "scalping" system more conspicuous and deplorable, a whole district of the island, between the tillage and the mountain, being laid utterly bare, the turf being carried off, and the naked rock left to glare in the sunshine.

Every year the productive portion of the soil is from this cause diminished in extent as completely as if a slice of the island were annually cut off and thrown into the sea. Dr Scott is fully alive to this continuous destruction of his property; but if resident landlords find it almost impossible to contend against so inveterate a habit when practised under their own eyes, it can easily be imagined that it would be peculiarly difficult effectually to check it in an island surrounded by waves that make a visit to it a matter of difficulty, and an exit from it often an impossibility, for weeks at a time.* Foula is famous even in Shetland as the nesting-place of countless myriads of sea-fowl, which literally cover the stupendous cliffs, and when disturbed swarm into the air, giving the island the appearance of a huge bee-hive. Formerly the birds and their eggs were regularly taken by the inhabitants for food, the adventurous cliffsmen being let over the precipice by ropes; but this dangerous practice has for some time been discontinued.

Considerably to the north of Foula, and situated in the noble bay of St Magnus, are the two islands of Papa Stour and Muckle Roe, the former containing 351 inhabitants and the latter 216. These islands belong to the trustees of Gifford of Busta and to Lady Nicholson. Both places are terribly "scalped" and wretchedly farmed, and the inhabitants are as poor as any in Shetland.

Opposite Muckle Roe, in Mainland, Major Cameron and his factor, Mr Walker (in unusual partnership), sheep farm together on a large scale. At Garth, in the parish of Delting, they keep a flock of 2500 Cheviot ewes, from which they rear half-bred lambs, though at the majority of the farms which they occupy together, they use blackfaced ewes. Opposite this portion of Mainland, on the eastern coast, is situated the considerable island of Whalsay. It lies about ten miles north of Bressay, to which it is nearly similar in size and population. Whalsay is the property of Mr Bruce of Symbester, whose stately mansion-house of Aberdeenshire granite, built at a cost of L.20,000, is seen from great distances, but, being unfortunately too large for the property, remains uninhabited. The soil of this island is free and light, and capable of considerable cultivation, but it is in many places severely "scalped." It has the benefit of having as a resident, Mr Shepherd, a Dundee man and a capital agriculturist, who occupies a farm of 600 acres in the island. Mr Shepherd practises tillage to a certain extent, but devotes most of his attention to a fine flock of ewes, from which half-bred lambs are reared. The produce of 1872 were sold at home for 30s.

Near Muckle Roe the Atlantic and German Oceans all but meet, a narrow isthmus of a few feet, called Mavis Grind, being all that is left of the land, thus rendering the northern portion of Mainland a peninsula in a very remarkable degree. No part of Shetland is more attractive to a stranger than this district, which forms the romantically beautiful parish of North Maven.

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* Some years ago a worthy burgess of Lerwick ventured to visit Foula, and, being caught there by the storms of autumn, had to remain a prisoner in the island for five months.

Along its western seaboard stretch many miles of smiling green sward, affording fine pasturage for sheep, whilst the precipices which gird the shore, as well as the adjacent islet rocks, are so eaten into by the ceaseless waves of the Atlantic, that they have in many cases assumed the most strange and fantastic shapes. One islet in particular resembles a three-masted ship, and the eye is never weary of gazing upon a scene at once so singular and so grandly beautiful. Here, too, is situated Rona's Hill, the highest peak of Shetland, almost surrounded by a narrow voe, which winds round its base, forming a splendid harbour, in which many a good ship has found a refuge.

Rona's Hill cannot measure itself with mountains, as its altitude scarcely exceeds 1400 feet, but there are many circumstances which render it specially remarkable. The distant Foula excepted, it has not even a rival in the isles, and from its summit a view of the whole archipelago can be obtained, and no one can gaze upon the island group without being struck by the extraordinary spectacle presented to his view. Land and water seem inextricably intermingled. The moors are dotted by innumerable lakes, whilst the sea has so pierced the shore-line with multitudes of long sinuous voes, earth and ocean being so interwoven, that one might say they had clasped their fingers together in a close and friendly greeting. The rock of which Rona's Hill is composed is as remarkable as its position. On one side only is it accessible, the rest of its circumference being girdled by precipices, which rise up stark and sheer from the waves. And these majestic cliffs are one mighty mass of darkly glittering syenite, as deeply sanguine as the typical stone from which the rock derives its name on the far-off banks of the Upper Nile. Here the sea eagle still maintains an ancient eyrie, nor need the island sheep farmer much complain, as this is perhaps its only remaining nesting-place in Shetland.

Three important islands in the north remain to be described—Yell, Fetlar, and Unst. Though following it at a far distance, Yell is next to Mainland in extent, being about twenty miles in length and from seven to eight in breadth. As regards population, however, Yell, which contains 2732 inhabitants, is slightly exceeded by the much smaller island of Unst. Surrounded in a great measure by frowning precipices, and having much of its surface occupied by peat mosses and dreary moors, covered with a scanty growth of heather, the general character of the island may still justify its appellation, as it doubtless originally received the name of Yell to indicate its barrenness. Buchanan in his History has drawn a lively picture of its inhospitable aspect, and says that it is "so uncouth a place that no creature can live therein except such as are born there." Yet there are now a number of good sheep farms in Yell, well and profitably managed by enterprising tenants, who rear within its limits thriving flocks of Cheviot and blackfaced sheep. Yell belongs to several proprietors,—Major Cameron, Mrs Henderson Robertson of Glassburgh, Joseph Leak, Esq., and Mr Macqueen of Burravoe, who is resident. Here Major Cameron, in conjunction with Mr Walker, farms very extensively, occupying land belonging to other proprietors as well as the Major himself. At Windhouse they have 3000 blackfaced wethers, selling their three-year-olds in Edinburgh at about 45s. In North Yell they have together five farms, containing nearly 10,000 acres, with a pure blackfaced stock; whilst at one farm, Kirkabester, they have a flock of 450 Cheviot ewes with Leicester rams. The farm of West Sandwick is well managed by Mr George Keith, who breeds pure Cheviots.

Immediately to the east of Yell, and separated from it by three or four miles of sea, is the fine island of Fetlar, which is about seven miles long by five broad, and contains 517 inhabitants. Much of the geological structure of Fetlar is similar to that of Yell, but in some districts the rocks are composed of limestone, and in others of serpentine. Fetlar is said, like Yell, to derive its name from the nature of its soil; but, in contrast to the neighbouring island, its designation is supposed to be indicative of its natural fertility. A small portion of the island belongs to Lord Zetland, and the rest to Lady Nicholson. Its rich pastures are famous as being among the best in Shetland; but in spite of its natural advantages, and of the fact that the chief proprietor farms extensively, it must be admitted that much more might be made of it than is at present done. The land wants draining very badly, and the stock of sheep, a Cheviot one, consisting of some 1200 ewes, might be much improved. At present it is understood that the annual loss from death among lambs is unusually large.

Farthest north of all the Shetland group, and at the same time the most northern spot of Great Britain, is the important island of Unst. Whether as regards its natural advantages or the eminent men which it has produced, this real Ultima Thule is looked upon with a peculiar fondness by the islanders in general, and by its natives is sometimes called the "Garden of Shetland." It is in Unst alone that any definite progress can be noted in the agriculture of the crofters. Here, both as regards husbandry and stock-breeding, the fisher-farmers have decidedly improved upon the practice of former years. In their tillage they have adopted the rotation of crops, and, having crossed their native cows with good bulls, they are now enabled, as already stated, to sell the produce when stirks (year-olds) at from L.5 to L.7.

The law of steelbow is unfortunately in full force in this island as regards live stock, but for which still greater progress might be confidently expected. The shore-line of Unst is very irregular, but in its general aspect the island is oblong in form, and is about ten miles in length and five in breadth, and contains 2768 inhabitants, being thus second to Mainland in point of population. Like most of the islands, gneiss forms the largest portion of the rock of Unst, but in several districts the much rarer formation of serpentine occupies a considerable space.

A mine of chromite of iron, discovered fifty years ago by Dr Hibbert, was long worked, but the mineral having greatly declined in value, operations were discontinued for a number of years. Modern science, however, having lately discovered a new use for this substance in the manufacture of yellow paint, the mine is again in full operation.

The proprietors of Unst are Major Cameron and Edmondston of Buness, the latter of whom is resident in the island during a portion of the year. In the south of the island the farm of Belmont and the adjacent islet of Uyea are occupied by Mr Jeffray, an energetic and successful farmer, who emigrated from Aberdeenshire about sixteen years ago. At Balta Sound, part of Mr Edmondston's property is farmed by his cousin, Mr David Edmondston, who keeps a flock of blackfaced ewes.

Mr Hamilton, a son of the respected pastor of Bressay, occupies the farm of Houlland, the property of Major Cameron, who has lately erected an entirely new and substantial farm-steading for his tenant. Like so many other Shetland farmers, Mr Hamilton has recently adopted the blackfaced breed of sheep in place of the Cheviot, which formerly constituted his flock. Of all descriptions of domestic animals none are so out of keeping with the present time as the swine of Shetland, and in this respect Unst cannot claim much superiority over the sister islands. We well remember how, on first crossing its moors, we started with astonishment on suddenly coming upon two most remarkable specimens of this class of animals. They were deep in the hollow of a peat-bog, and we were truly doubtful as to their species. They were entirely covered with huge bristles, had a fierce and terrible aspect, and were more like savage and long-haired hyenas than anything of the race of pig. That such creatures could be converted into bacon was impossible. "What are these?" we exclaimed; and a friend who knew the country replied, "Why, pigs, to be sure." But he told us a story which, if not literally true, might very well have been so. He said that a ship carrying some of these uncouth animals to London was wrecked somewhere on the Yorkshire coast, and two of the carcases were cast ashore. On finding them, the people thought they were some strange marine monsters, and they were eagerly bought and stuffed by the keeper of a local museum as extraordinary curiosities.

Such being the general character of the swine of Shetland, any attempt to improve them is the more deserving of credit, and this meed of praise is certainly due to Mr John Craigie of Lund, in Unst, who has for some time past cultivated this branch of husbandry, and rears pigs of improved English breeds. Lund, it may be proper to remark, unlike most farms in Unst, is not let upon the ancient steelbow system. We have thus endeavoured to conduct the reader from Fair Isle to Unst, from north to south of the Shetland archipelago, and in doing so we have necessarily zig-zagged across the group in what may seem a somewhat erratic course. We have now reached the utmost extremity of British cultivation, but beyond even this there is a human habitation. About a mile seaward of the northern shore-line of Unst several naked rocks shoot up from the waves. They are of the form called "stacks," slender conical spits of gneiss. On the highest of these, 200 feet above the sea, is built a magnificent lighthouse. The "stack" was practically inaccessible till scaled by an iron ladder firmly rivetted to the rock. The lighthouse rises fifty feet above the summit, yet during the storms of winter the waves often scale the tower, and, thundering upon it, seem to threaten its existence. It is to war that peace owes this gift to the northern mariner. During the Crimean war, when England wished to attack Russia in the Baltic, she discovered that the approach to Britain from the North Sea was as dark as it was drear. Cheaply, at a cost of L.32,000, that wave-lashed "stack" now holds out a nightly lamp towards the polar star—a light which tells the voyager that he once more sees the realms of civilisation, and has reached the rough but friendly shores of Ultima Thule.

Several Legal and Local Terms now or formerly in use in Shetland.

Wadmel. Woollen cloth.
Mark. Eight pieces of wadmel, each piece being six ells.
Udal or *Odal.* Free property.
Udaler. Freeholder.
Scat. A land-tax first paid in wadmel and subsequently in butter and oil.
Scattold or *Scathold.* Pasture land which paid tax.
Scott-wattle. Sheep and ox penny.
Hagra. Marches. Riding the hagra, riding the marches.
Stent. The amount of scat paid in butter.
Cost Grain rent.
Flesh. Rent paid in cattle.
Wallett. An assessment for the salary of the underfond (sheriff-substitute).
Leispund. A weight equal to one-fifteenth of a barrel.
Span. Equal to one leispund.
Mail. Equal to six leispunds.
Cruive. A pound for smearing sheep.
Plantie cruive Enclosure for rearing cabbage.
Ruing. Removing the wool of sheep with the hand.
Voar. Seed-time.
Casie. A straw basket carried on the shoulder.

ON ABERDEENSHIRE WOODS, FORESTS, AND FORESTRY.

By ALEXANDER SMITH, C.E. and Surveyor, Aberdeen.

[*Premium—Ten Sovereigns.*]

THE county of Aberdeen is situate in latitude 56° 52′ and 57° 43′ north, and between 1° 50′ and 3° 46′ west longitude.

Its greatest breadth from south to north is about 40 miles from Aberdeen to Kinnairdshead; and its greatest length from north-east to south-west is 85½ miles—from Cairnbulghead to Cairn Ealer, on the confines of Perth and Inverness-shires.

On the north and east it is bounded by the Moray Firth and the German Ocean; and the seaboard, which has a convex form, measures 60 miles, following the sinuosities of the shore. From the mouth of the Dee at Aberdeen to Collieston in Slains (14 miles), the coast presents one uninterrupted reach of sandy beach, bordered by flat, broken, sandy hills of no great height, covered with sea-reed,* which effectually consolidates the drifting sand and prevents the encroachments of the sea; and from the mouth of the Ugie to Fraserburgh (about 14 miles), the sea-shore is of a similar description. From Collieston to Peterhead, and from Kinnairdshead (Fraserburgh), to Pennanhead, with few exceptions, the coast is very bold and precipitous, as at old Slains Castle, the Bullers of Buchan, Stirling Hill, and on the Aberdour shore, the rocks rise in perpendicular height from 100 to 150 feet from the sea. They consist of the red granite, gneiss, and quartz rock in their different formations, with the old red sandstone at Pennanhead.

On the south the County is bounded by the Dee for about twelve miles, from Aberdeen to the Mills of Drum in Kincardineshire, where that County crosses the river to the north by the parish of Banchory Ternan. At the haughs of Sluie, about six miles higher up the river, the boundary recrosses the Dee, and continues southwards by the Cairn o' Month road to the Water of Aven—a tributary of the Feugh—thence westward by the Aven and the Grampian range of mountains, south of the Forest of Birse, by Montbattock, 2608 feet above sea level, Montkeen (3130 feet), and the Firmouth, and south of Lochnagar (3810 feet), and the Dhuloch (2000 feet), and by the top of the Cairnwell (3110 feet); and westwards along the summits of the Scarsoch Hills (3430 feet), to the top of Cairn Ealer, which has an elevation of 3350 feet above sea-level.

On the west, the boundary with Inverness-shire runs from Cairn Ealer along the summits of Cairntoul (4250 feet), and the Braeriach mountains (4227 feet), to the north-west of Benmacdhui, which has an elevation of 4296 feet above sea-level, and is the second highest mountain in Scotland, Ben-nevis being, it is said, fully 100 feet higher; and on the north and west the boundary with Banffshire runs in an easterly direction along the Ben-avon range of mountains (3840 feet), to the low narrow neck of land at Inchrory in Kirkmichael, where the water *shears* as between the springs of the Don (1760 feet) and the Water of Avon, a tributary of the Spey. From Inchrory the boundary is over the Lecht (2700 feet), by Glenfiddoch and by the north boundaries of Strathdon, Glenbucket, and divides the parish of Cabrach; and by the west boundaries of Glass and Cairney, and to the north of Huntly; and by the river Doveran, but only that portion of the river which forms the west boundary of a small part of Forgue, and by the Doveran along the parishes of Turriff and King Edward; and from the Doveran, a little below the house of Eden, the county boundary takes an easterly direction between the parishes of King Edward and Gamrie in Banffshire, and Aberdour and Gamrie, by the Tore of Troup to the sea at Nether Mill of Pennan.

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* *Ammophila arundinacea.*

The whole area of the county is computed to be 1,260,625 acres, of which there are 579,578 acres under tillage, 113,000 acres growing wood, and 568,047 acres of pasture and waste. But the accuracy of these figures may well be doubted, as the owners and occupiers of land are often averse to give correct statistics on a subject which might afterwards affect their interests.

The number of acres under tillage is taken from agricultural returns published by the Board of Trade in 1872, and the number of acres growing trees has been got from various sources by the reporter, during professional engagements extending over a period of about thirty years, but cannot be relied on as correct.

As to areas, it may be incidentally remarked that in 1813 a base line of over five miles in length was laid down along the Links of Belhelvie for the triangulation of Scotland and the Ordnance Survey; but we are still without a complete measurement or map of the County, and those detached portions which are completed are stored away in the Ordnance stores at Southampton.

With these few geographical and statistical statements bearing upon the position of this large County, and before proceeding to give only a bare outline and meagre description of the physical aspect of the woods and plantations of Aberdeenshire, scattered as they are over such a wide range of country, the reporter found it not only desirable but necessary to abandon all reference to its four ancient divisions—viz., Mar, Garioch, Formartine, and Buchan. As the boundaries of these districts are now only known to a few individuals, and in a good many places they are almost, if not altogether obsolete, therefore, and for the purpose of this report, the County has been divided into five river districts, and to each fluvial territory the apportionment has been made by the watershed of each river and of its tributaries. These are,—first, the Dee; second, the Don; third, the Ythan; fourth, the Ugie; and fifth, the Doveran.

First we come to notice the plantations in the lower valley of the Dee, from Aberdeen to the Mills of Drum in Kincardineshire. This district comprehends the suburban portions of the parish of Old Machar, lying west of the City; a portion of the parish of Banchory Devenick; the parishes of Peterculter, Drumoak, Skene, Echt, a small portion of the parish of Newhills, and the south-western half of Midmar parish.

For a distance of between three and four miles west of the City the country has been divided into many small residential estates, on which, and within the past few years, many handsome residences have been built, and their grounds tastefully laid out by clumps and belts of planting, consisting chiefly of hardwood trees, beech hedges, and evergreen shrubs. On the Hill of Pitfodels, at "Corbietap," there still remains a portion of an extensive old Scots fir plantation, which yielded timber of a good quality but not of great size. On Countesswells and Hazelhead, which are situate on the high ground west of the ornamental plantations of Woodhill, Rubislaw Den, Craigiebuckler, Hillhead, and others, the old plantations of Scots firs and larch in some parts are well mixed with common spruce and silver firs, and cover a large area of ground. The Scots firs in general are green, but not growing; the larch trees altogether are either dead or dying; but the silver firs are in a remarkably thriving state, although little attention seems ever to have been paid to them as to thinning. In the grounds of Countesswells there are some fair specimens of old ash, elm, and willow trees; and at Woodhill, Springhill, and Whitemyres, the belts of hardwood trees are ornamental and very useful for shelter. On Sheddocksley, the belts of Scots firs and larch have a very stunted appearance; and along with some neglected beech hedges, they afford but little shelter to a rather cold, high-lying district. Westward by Kingswells House there are some fine old ash trees; and here may be seen a pretty successful experiment, on a small scale, of what can be done in planting on partially worn-out peat moss, and the improvement of cold marshy ground by draining and planting.

On the estates of Culter, Deebank, Murtle, and others, in the parish of Peterculter, the plantations cover a large area of ground. The old Scots fir and larch plantations around the mansion-house of Culter and in the Den, are well grown, and, along with some very fine old beech, birch, and chestnut trees, and some fair specimens of the *Cedrus deodara* in the policies, they are very ornamental. The plantations in the den and policies of Murtle

House, and on the higher ground towards Countesswells, are very thriving, and of a highly ornamental character. In the garden of Murtle, which is close on the banks of the Dee, and well sheltered, there are some fine specimens of the Athenian poplar.

The Dee, opposite to the manse and church of Peterculter, is 72 feet above sea-level; the "Weather-craig," the highest land in the parish, 620 feet; and the highest planted ground, Countesswells Hill, 608 feet.

In Skene the plantations cover about one-eighth of the whole parish, the principal plantations being those upon the estate of Skene. On Easter Skene, Kirkville, the Leddachs, Westhills, Kinmundy, the Ords, and the Carnies, they consist of isolated clumps and belts of Scots firs and larch, and some belts of hardwood trees at Kirkville, and in the well-kept grounds of Easter Skene; but, altogether, these detached plantations afford but little shelter to a rather cold district, and do not promise to become of much value as timber. On the property of Westhills, and within the past fifteen years, a considerable extent of flat mossy ground has been planted up with various kinds of forest trees, chiefly for the purpose of forming shelter to a recently erected residence. In the extensive plantations around Skene House and in the policies, the Scots firs and larch trees are well mixed with common spruce and others of the Abies tribe, along with ash, oak, and birch trees, and here there is one fine specimen of a horse chestnut on the lawn in front of the house. The outlying plantations on the estate are mostly full grown. The younger plantations in the policies, conjoined with the older trees, are very ornamental, and appear to be in a thriving state.

The Loch of Skene (500 acres), which skirts the policy grounds on the south, is 290 feet above sea-level; and the highest land in the parish, the Keirhill, 760 feet.

In the parish of Echt, the plantations, which are chiefly on Dun Echt, comprise an area of 3000 acres. They consist of Scots firs and larch, partially mixed with common spruce of various ages, but mostly full grown, and the whole have been well laid out both for ornament and shelter. On the Barmekin (900 feet above sea-level) the Scots firs have attained considerable size; and on that portion of the hill which tends away in a north-easterly direction, the Scots firs, larch, and common spruce are large well-grown trees, and produce timber of a fair quality. The younger plantations are those upon the north-east slopes of the hill of Fare, and extend from the base of the hill to the height of about 1400 feet above sea-level. The Dun Echt portion of this hill was planted about forty years ago with Scots firs and larch, which have succeeded remarkably well, especially those in the corries upon the lower slopes of the hill. The plantations on the Midmar or north face of Fare, are very thriving, so are also those plantations recently formed on the east or Cullerlie side of the hill.

The policies of Dun Echt are well wooded and highly ornamental. About fifty years ago the then proprietor of Echt transplanted into these grounds about 150 large well-grown hardwood trees of various kinds, on the plan recommended by Sir Henry S. Steuart, Bart. of Allantoun, nearly all of which succeeded; but since the accession of the present noble proprietor to the estate, and by the extensive alterations and improvements which he has made on the residence and policies, it is to be feared that many of these trees have been lost sight of.

On the estate of Cullerlie, and along the south-east base of the Hill of Fare, a considerable extent of muir and flat mossy ground has lately been substantially enclosed and planted with various kinds of forest trees, including the natural birch, which are scattered over the slopes of the hill. These young plantations must improve the climate.

In the south-west division of Midmar parish stands the old castle, surrounded by fine old plantations of Scots firs and hardwood trees of every description, which have been well laid out both for ornament and shelter. At the church and manse and on the lower ground, the belts of hardwood trees, spruce, Scots firs, and larch, and fine beech hedges, have been laid out with taste and to great advantage, considering the undulating nature of the ground and the proximity of the woods to the steep slopes of Fare.

The Leuchar Burn, at the Garlogie Mills, the lowest point in the parish of Echt, is 275 feet above sea-level. The Tillyoch Burn, near to Mill of Hole, Midmar, is 417 feet, and the highest point of Fare, also in Midmar, is 1510 feet.

In the parish of Drumoak the plantations cover nearly one-fourth of its whole area, but of late years a considerable extent of ground has been cleared of timber, and not much planted. The older plantations are those lying to the west, north, and east of the old castle and residence of Drum, around which there are some fine old hardwood trees, such as ash, elm, and oak, which have attained to large size. North and east of the castle there are some fine old Scots firs, larch, alder, and birch trees, and several large clumps and belts of thriving Scots firs and larch on the site of the old Camp, and at the manse and church.

On the estate of Park the plantations are now very much confined to the valley of the Dee and to the grounds of the mansion-house, which stands close to the banks of the river. These plantations have been well laid out in belts and clumps both for ornament and shelter, and contain a fine variety of forest trees, consisting of Scots firs and larch, well mixed with oak, birch, beech, ash, and spruce trees, but, being upon gravelly soil and of considerable age, they do not promise to attain much greater size.

The Dee at the Ferry of Drumoak is 102 feet above sea-level, and the highest land in the parish is 495 feet.

Passing the finely-wooded parish of Banchory Ternan in Kincardineshire, we come to the upper valley of the Dee, and the parishes of Kincardine O'Neil, Birse, Aboyne and Glentanar; Lumphanan, Coull, Tarland and Migvie; Logie-Coldstone, Glenmuick, Tullich and Glengairn; and Crathie and Braemar. In Kincardine O'Neil parish, the Scots fir and larch plantations on the Kincardine estate, including those of Dalhaikie on the east and Stranduff on the west, extend along the left bank of the river for several miles, and cover a large extent of hilly ground. The pines and larches generally in this large range of woods have come to maturity, and of late years a good many of the older trees have been cut down. But from Sluie upwards to Dess and its ornamental grounds, the valley of the river is still well wooded. At Kincardine O'Neil village there are some fine old ash trees and old Scots firs in the grounds of the Lodge, and ornamental hardwood trees and natural birch on the steep braes at Borrowstoun. On the estates of Campfield, Craigmyle, and Learney; the plantations extend for many miles along the base and south and west slopes of the hill of Fare. On Campfield the young plantations of Scots firs and larch, mixed with common spruce on the lower ground, are very thriving, and here is to be found a remarkably prolific species of the *gean tree*, which bears fruit of a large size, and all over the lower uncultivated ground the common holly is indigenous and very abundant. The Craigmyle plantations cover a large area of ground on the lower and south-western slopes of Fare, and in the grounds around the residence there are some fine old Scots firs and larch, with an agreeable variety of beech and other hardwood trees. On the estate of Learney the Scots fir and larch woods cover an extensive range of hills and their slopes; one plantation lying to the north and west of the mansion-house is said to comprise an area of 1000 Scots acres. The grounds are well laid out by belts and clumps of mixed forest trees, with some well-grown spruce trees in the plantations north-east of the mansion. On the property of Findrack and on the braes of Tolmaads the plantations of Scots firs and larch are young and of no great extent, and afford but little shelter to an exposed high-lying district.

The Dee at the haugh of Sluie is 249 feet above sea-level, and the highest point of Fare is about 1340 feet.

In the parish of Birse the plantations are now confined to those upon the estates of Finzean, Ballogie, and Balfour, and cover probably between 4000 and 5000 acres. Birse simply means a wood or a thicket, and the forest of Birse, now almost treeless, was said to have been "a thicket of holly, aspen, mountain ash, alder, gean, hazel, and some oaks." On the estate of Finzean the old Scots fir and larch plantations are extensive and very valuable, but of late years a good deal of the timber has been cut down. Those that now remain are chiefly confined to the valley of the Aven or Aan, and to the grounds around the mansion-house. On the estates of Ballogie, Balnacraig, and Midstrath, the old Scots fir and larch plantations were at one time very extensive and valuable, but previous to the accession of the present proprietor to these estates, most of the marketable timber was disposed of; however, within the past twenty years, a considerable extent of the old woodland has been planted up, and new plantations formed both for shelter and ornament, so that the woods of Ballogie, from all appearance, will soon regain their wonted prominence. On the estate of Balfour, about thirty years ago most of the old Scots firs were cut down, but at the same time the greater part of the hill ground pertaining to the property was substantially enclosed by stone dykes, and planted with Scots firs mixed with larch, which have succeeded remarkably well, considering the high position of the ground, lying as it does between an exceptional bare reach of the Dee and the treeless forest of Birse. The hill of Birsemore, on the west of the parish, and opposite Charlestown of Aboyne, yielded Scots fir timber equal in quality to that of the best Baltic white pine, but here the "woodman" has only spared a few trees, and these are only to be found on the top and most inaccessible portions of the hill.

The Dee at the Bridge of Potarch is 296 feet above sea-level, and the Gainach Hill in Birse 2580 feet.

In the united parishes of Aboyne and Glentanar the ground-growing timber is estimated at between eight and nine thousand acres. The extent of planted ground on both sides of the river, and including the ornamental plantations in the policies of Aboyne Castle, is very large. The soil and climate seem to favour the growth of both pines and hardwood trees. Of hardwood trees, the oak, ash, birch, and elm seem to succeed best. Near to the Castle there are some fine specimens of the old Scots fir, and throughout the adjoining plantations the larch, common spruce, and birch trees form a pleasant variety. Nearly thirty years ago most of the full-grown timber in the outlying plantations of Aboyne was cut down and the ground replanted; but many years must elapse before the Aboyne woods attain the prominence they once had. Along the south bank of the river, from Craigendinny westwards as far up as Dee Castle, a large tract of muir ground has recently been enclosed and planted chiefly with Scots fir, mixed with larch and hardwood trees; and with the natural birch and hazel bushes the valley has been much beautified.

The old forest of Glentanar extends from near Craigendinny on the Dee, along the water of Tanar and its tributaries, the Allochy and the Gairney, to far up the lower slopes of the Cockcairn, Montkeen, and the Firmonth; but from the straggling position of the trees on the outskirts, no exact estimate could well be formed of its extent. It is believed, however, that the area of ground covered with timber of all ages and condition is about 6000 acres. Glentanar is said to be a remnant of the ancient Caledonian forest, and within the past three-fourths of a century the timber in it has been twice cut down, and portions of it twice seriously injured by fire; but for about twenty years it has been allowed to "rest and be thankful." Scots fir trees, which were cut down in this forest in 1796, 11 inches in diameter, counted 130 concentric circles, and the timber was sold at about fourpence per cubic foot (*vide* Sir John Sinclair's "Statistical Account of Scotland"). In 1841 the wood cut down in Glentanar brought little or anything more than the cost of cartage to Aberdeen; owing to the almost inapproachable position of the best trees in the forest, most of them being too heavy to be floated by the river except in time of flood. The soil in Glentanar on the alluvial haughs is good gravelly loam, overlying drift and rough sand, and on the lower slopes of the hills it is much of the same quality—rather more loamy, with disintegrated granite rocks. Higher up the hills, where trees do not now grow, it is broken moss, bleak rocky mountains, only partially covered with heather.

The Dee at the suspension bridge of Aboyne is 397 feet above sea-level, and the Cockcairn in Glentanar 2500 feet.

In the valley of Lumphanan the planted ground is of a very limited extent, there being only a few clumps of old Scots firs and larch on the Finzean lands and on Auchenhove, with some belts of stunted Scots firs and larch trees on Glenmillan. The younger plantations of Scots firs and larch on the hills east of the manse and church, are of too limited extent either to afford shelter or be of any value as timber. Those in the valley north-eastward of the church, by Tillyching, are very thriving.

The outlet of the old loch of Auchlossan at the Muir of Dess is 423 feet above sea-level, and the Tirebagger Hill on the west of the parish 1540 feet.

In the vale of Cromar, which comprehends the parishes of Coull proper, Tarland and Migvie, and Logie-Coldstone, the chief plantations of Scots firs and larch are those upon Lord Aberdeen's estates, and on Corrachree, West-town, Blelack, Coldstone, and Tillypronie. On the Aberdeen-Cromar lands the trees are of no great age or size, but of considerable extent and value, and pretty well disposed of for shelter. On the lands of Corrachree and West-town, which lie high, almost in the centre of the valley, from south to north, the plantations of Scots firs and larch, with some thriving beech hedges, have all been planted within the past thirty years, and are now very valuable for shelter. On the lands of Blelack some years ago, most of the older plantations of Scots firs and larch were cut down, but there still remain some fine specimens of the old pines, larch and spruce trees; and closely conjoined with the Blelack woods are those on the Coldstone lands and on the old moor of Coynach. Altogether these plantations cover a considerable portion of the south-west division of the vale, and are of great value for shelter. Along the west braes, and on the estates of Melgum, Tillypronie, and others, within the past few years, a considerable extent of hill ground has been partially enclosed and planted up, and these young plantations promise well to afford shelter to an extensive, bare, cultivated valley which lies to the west of Tarland. At the village of Tarland there are some fine old ash trees; and around Lochs Kinnoir and Dawin, and all over the Muir of Dinnet, from Ferrar of Aboyne to Culblean, the natural birch, the ash, and the aspen, where protected, grow spontaneously and freely, but from a general want of fences for protecting the trees, this extensive moorland plain has a very naked appearance.

The Cushnie and Towie Hills upon the north rise from 2000 to 2600 feet above sea-level, and Morven on the south-west is 2954 feet.

In the united parishes of Glenmuick, Tullich, and Glengairn, the woods and plantations are chiefly in the valley of the Dee, and on the estates of Aboyne, Monaltrie (Ballater), Glenmuick, Abergeldie, and Birkhall. In the well-wooded ravine or Pass of Ballater there are some good specimens of well-grown Scots firs, larch and oak trees. Eastwards by the Bridge of Tullich, and along the banks of the river by Trafantrich, the natural birch, the ash, and the aspen (with some planted clumps of Scots fir and larch), richly clothe the valley. On Craigandarrach, *i.e.*, the Hill of the Oaks (1425 feet), the Scots fir and larch trees cover the hill to its highest point; and on the south-west base, along the river slope of the hill, the oak coppice seem to be indigenous, and mixed with the coppice there are some well-grown oak, birch, ash, and aspen trees, all in a thriving state. Returning to the right bank of the river, as between Dee Castle, Pannanich, and the water of Glen Muick, or the Sow's Valley, the natural birch, hazel, the aspen, and Scots firs grow freely along the river, on the uncultivated ground, and on the lower slopes of the hills and glens. The birch tree attains to considerable size, and when manufactured into bobbins—thread pirns—is of great value.

At Pananich, the old Scots firs on that hill have recently been cut down, and now only a few straggling trees remain in inaccessible places, with bushes of birch, hazel, and juniper—far from enough to cover its bare precipitous crags.

On Abergeldie and Dorsincilly the older plantations of Scots firs and larch cover a large area of rather high ground, those around the old Castle of Knock being the most conspicuous. The plantations of Abergeldie Castle, which lie along the river, contain some fine old Scots firs, larch, and birch trees, mixed and massed with some fine spruce, ash, and plane trees, in the private grounds of the residence.

Along Glenmuick, by the recently-erected mansion of that name, and Birkhall upwards to the Linn of Muick (1200 feet), the valley is thickly covered with birch and aspen trees, hazel and juniper bushes, with some plantations of Scots firs and larch at the house of Birkhall and at the linn. At Aultnaguisach, or the Hut (1374 feet), which stands near to the north-west margin of Loch Muick (1310 feet), there are some clumps of stunted Scots firs, larch, birch, and juniper bushes, in the midst of a vast expanse of mountain moorland, covered with heath and other alpine plants. Along Glengairn, the waters of which fall into the Dee about two miles above Ballater, the natural birch and rowan tree are abundant, with few plantations, except some old larch and other forest trees at Gairn Shiel, 1110 feet above sea level; but here they do not seem to thrive.

The Dee at the Bridge of Ballater is 664 feet above sea level.

On the north bank of the Dee, and as between the confluence of the Gairn and Crathie church, there are only a few plantations of Scots firs and larch, but along the river, and on the lower slopes of the hills and in the glens, the natural birch, the alder and juniper bushes, are to be met with in great abundance.

In the parishes of Crathie and Braemar, the woods and natural forests of Scots firs, larch, and birch, are those upon the royal estates of Balmoral, Abergeldie, Invercauld, and Mar Lodge.

On the estate of Balmoral, and previous to Her Majesty taking up her residence on Deeside, the plantations were of small extent; but within the past twenty years the steep, rugged, rocky hills on both sides of the river have been planted up with forest trees of every description, both native and foreign, and conjoined as these young plantations now are with those of Abergeldie on the east and Invercauld on the west, they will in a few years cover the bleak, rocky, scantily heath-covered mountains, embower Balmoral among woods, and shelter it from the "stormy mists of dark Lochnagar."

The policies of Balmoral Castle lie along the right bank of the river, and extend from below the manse of Crathie up to the confines of Ballochbuie forest, a distance of between two and three miles. Originally this somewhat long stretch of flat land was covered with natural birch and Scots firs, with patches of arable land around some homely Highland shielings. But the whole has been remodelled and transformed into pleasant lawns and fertile fields, interspersed with belts and masses of highly ornamental forest trees and evergreen shrubs of every description. These young clumps of planting have been grouped with the older Scots firs and larch woods which skirted the private grounds on the south, now blend harmoniously with the young plantations on the hills rising in the direction of Lochnagar, and all have added much to the natural beauties of the valley; and by judicious management the severity of the climate will be to some extent subdued, and the amenity of the district lastingly improved.

The Dee, opposite to the manse of Crathie, is 872 feet above sea level; Balmoral Castle is 926 feet.

On the left bank of the river, from Inver to Mar forest, and from the Balmoral estate to Castletown of Braemar on the right, are the natural and planted woods of Invercauld. Along this extensive portion of the valley, and in Sir John Sinclair's "Statistical Account of Scotland" (1796), it is stated that, on Invercauld in Braemar, there had been planted fourteen millions of Scots firs and one million of larch trees, equal to plant 3000 acres, which must be considerably under the extent of ground now covered with trees. On the right bank of the river, below the old bridge and the falls of Garrawalt (1118 feet), is the forest of Ballochbuie. This forest produces some fine, large, clean-stemmed Scots fir trees, the timber of which is very close in the grain and pretty free of knots; and of late years much of it has been used for shipbuilding, or such like purposes, where large sized trees are required. On the left bank of the river, for several miles below and above Invercauld bridge, the valley of the river, and the southern slopes of the Benavon range of mountains, and of Benabuird (3864 feet), are well covered with Scots firs, larch, and natural birch trees, with some fair specimens of common spruce and silver firs in the corries of the hills. In the policies of Invercauld and around the mansion-house, which is backed by the well-wooded slopes of the mountains, there are some fine specimens of the oak, ash, birch, horse-chestnut, aspen, and elm trees. Opposite to the Invercauld grounds, on the south side of the river, the valley is bordered by huge precipitous rocks, in the clefts of which there are many gnarled pines, birch, and other trees, overhanging woody groves, and, with the clear river somewhat lazily winding its way through an extensive plain, encircled by "umbrageous woods," the scenery between Invercauld bridge and the Castletown of Braemar is "beautiful, wild, and majestic."

On the Mar estate the natural woods lie along the valley of the river, and in the vicinity of the lodge and the Linn of Dee. At Corriemulzie there are some mixed plantations, and at the linn and in Gleneye some clumps of larch, birch, rowan, and aspen trees of stunted growth. Along the road from Castletown to the linn, and in Glencluny and Glenquoich, the natural birch, the aspen, and alders, with some isolated Scots firs, and clumps of Scots firs and larch, the valley of the river and these glens are pretty well clothed with natural and artificial woods.

The wooded part of Mar forest lies along Glen Dee, for several miles above Mar Lodge, where some of the old trees exist, and the remains of others are to be found. Mar forest is said to have been, at some remote period, connected with the forests of Athole in Perthshire, and those of Badenoch in Inverness-shire; but as the arboriform connecting links of these forests do not now exist, imagination must be left to fill up the wide, wild space between. The ground occupied by this old forest, along with a mountainous tract of country equal to about 100 square miles, is chiefly occupied by the red deer and other kinds of mountain game. Some of the old natural fir trees which do exist are estimated to be between 200 and 300 years old, and to contain from 100 to 200 cubic feet of timber, "with a clean grain, free of knots, and full of rosin."

The old Castle of Braemar is 1077 feet above sea level, the Linn of Dee 1204 feet, and the Wells of Dee (source rather doubtful) 4014 feet.

Second, The Valley of the Don.—The plantations on both banks of the river commence at the "auld brig o' Balgownie," with the ornamental grounds of Seton House and the finely wooded braes of Balgownie and Persley, and the higher lying plantations of Scotstown House and Denmore. These woods, with the exception of some belts and clumps of Scots firs and larch on Scotstown and Denmore, and a few fine old Scots firs in the grounds of Seaton, are all composed of fine full-grown ash, elm, and beech trees, with some poplar and willow trees of a very ornamental description. On the north bank of the river, higher up than Persley, are the plantations and woods of Grandholm, Parkhill, and Fintray; and to the north of the latter place are the woods and policies of Elrick and Straloch. On Grandholm, Parkhill, Fintray, and Straloch, the Scots fir trees have attained to pretty large sizes; and in the private grounds of these places the hardwood trees, such as the ash, elm, and beech, are well grown and very ornamental. The younger plantations of spruce and larch on Parkhill and Fintray, and those upon Straloch, which are mixed with various kinds of hardwood trees, appear to be very thriving.

On the south bank of the river, opposite to Persley and Grandholm, are the ornamental grounds and hardwood plantations on Woodside, Auchmull, and Waterton; and farther southwards, in the parish of Newhills, and along the Buck's Burn up to Fairley, the plantations consist of belts and clumps of Scots firs and larch, but except for shelter, they are of little value. On the north-east shoulder of the bare Brimmond (870 feet) are the woods of Craibstone and the fine beech hedges on Hope Farm. The Craibstone plantations consist of fine old Scots firs and larch, with an extensive variety of old hardwood trees around the mansion-house. The young Scots fir and larch plantations on the upper barony of Stoneywood, with those of Tertowie and others, cover a large extent of both hill and low ground, and are generally thriving. The older plantations of Scots firs and larch on Kirkhill, Dyce, and Caskieben, surrounding the hill of Tyrebaggar (820 feet), have arrived at maturity, and of late years a good deal of the timber has been cut down.

Along the valley of the Blackburn, which falls into the Don at Kinaldie, the plantations consist of a few clumps of Scots firs, belts of larch, hardwood trees, and willow bushes, with beech and thorn hedges along the public roads; and with the ornamental plantations of Caskieben, Glasgoego, and Glasgoforest (Kinnellar Lodge), the valley is well wooded.

On the north bank of the river, from the Fintray House grounds to Keithhall, the plantations are those upon Wester Fintray and Balbythan. These conjoined plantations cover a large extent of low hill ground, and consist of well-grown Scots firs, larch, and spruce, which, along with several clumps and belts of hardwood trees dividing farms, afford valuable shelter to the rich haughs along the river. The younger plantations on Balbythan and Kinkell are very thriving. In the grounds of Balbythan House there is a fine specimen of an old beech tree, and some fine old ash trees at Kinkell, with thriving belts of hardwood and spruce along the river up to the influx of the Ury (164 feet), and thriving well-kept thorn hedges subdividing several of the farms, and along the public roads.

On the south bank of the Don, and in the valley of Kintore, there are several extensive young plantations of Scots firs and larch,—such as those upon the old muir of Kinnellar, Hall forest, and Wardes, on the borders of Skene, and on the north and west of the valley by Thainstone and Kemnay. North of the old Castle of Hall forest stood the extensive old Scots firwood of Toms' forest, which was cut down some years ago; but the ground has mostly been replanted with various kinds of forest trees, and gives promise of success. In the plantations and policies of Thainstone there are some good specimens of old Scots firs, spruce, and hardwood trees; and along the valley of the river up to the burn of Ton (270 feet), the plantations of Scots fir and larch are thriving. Around Kemnay House the plantations of Scots firs, larch, and spruce, along with some thriving young plantations of larch, spruce, and hardwood trees, and fine old beech hedge-row trees along the approach to the mansion, are very ornamental; from the burn of Ton, and southwards by Castle Fraser, Linton, and Corsindae, to the Midmar plantations and the Learney hills, and westward and north by the Corrennie hills (1570 feet), and the top of Cairn William (1470 feet), to the Don at Ramstone falls, in the vale of Monymusk and Cluny, which is well wooded.

The outlying plantations of Scots fir and larch on Castle Fraser are well grown, and in the grounds surrounding this venerable mansion there are some fine old ash and other hardwood trees. The plantations around Linton are young and very thriving; but here, and on Corsindae, a considerable portion of the older woods have lately been cut down. On the south-west of the valley, and on Kebbaty and Shiells, the older plantations are not of great extent, but recently extensive plantations of Scots fir have been formed on Corrennie. On the estate of Cluny proper the Scots fir and larch plantations cover a large area of ground, and the timber is of various ages, condition, and quality. They extend for several miles along the centre of the valley far up the north-east slopes of Corrennie, and at the old Castle of Tillycairn they occupy a very prominent position. Cluny Castle stands on the banks of the Ton, and is one of the finest modern castellated buildings in the country. The policy grounds are extensive, but somewhat flat. They are well wooded, and contain some good specimens of old ash, beech, and other hardwood trees mixed with Scots fir and larch, and altogether form a very pleasing landscape in the valley.

The Monymusk plantations cover a large area of low and hill ground, and consist chiefly of Scots firs, partially mixed with larch, birch, and spruce. The grounds of Monymusk House and surrounding plantations contain some fine old oaks, ash, larch, and elm trees, with some fine silver firs and common spruce. The younger plantations of Scots firs and larch are those upon the south and west slopes of Cairn William; but as they are situate at an elevation of from 500 to 1200 feet above sea level, some years must elapse before they attain to any size or be of much value, except to afford shelter and cover for game. On the right bank of the river, about two miles above Monymusk village, and in the old Garden of Paradise, there are, among other fine forest trees, several fine specimens of larch trees, said to be coeval with those planted at Dunkeld in 1743, and some of them measure upwards of 200 cubic feet of timber. The Monymusk Scots fir timber is of fine quality—the best produced on Don side—and always commands a ready sale.

Along the north or left bank of the river from Inverurie (174 feet) to Ramstone (294 feet), and on the eastern slopes of

Benachie, are the plantations of Ardtannies, Manar, Fetternear, Braco, Tillyfour, and Pittodrie. The plantations on these estates cover a large area of ground, and with the exception of some very ornamental thriving hardwood and spruce trees in the policies of Manar and Fetternear, and at Tillyfour and Braco, they consist of Scots firs and larch of various ages and quality, and being well grown, they are of great value. On Tillyfour and around the base of the Millstone hill, a high spur of Benachie, the oak, ash, birch, and rowan tree, along with hazel bushes, are abundant, with some clumps of fine old Scots firs on Enzean. The plantations at the church of Chapel of Garioch, along with the Pittodrie woods, which extend far up the north-east slopes of Benachie, afford considerable shelter to the valley below, and for that purpose alone they are of great value. Benachie is 1676 feet above sea level.

For about three miles above Ramstone the course of the river is through a wild barren valley called the Glentowns; but above this, the vale of Alford is opened up by the finely wooded grounds and estates of Castle Forbes. The woods on the north side of the river extend along the valley for miles, and high up the south-western slopes of Benachie, and south of the river for miles up the western slopes of Cairn William to Whitehouse. These plantations are chiefly composed of well-grown Scots firs and larch, the larch being to a considerable extent confined to the higher ground, where the trees are by no means in a thriving state. Along the river, and in the private grounds, there is a fair mixture of hardwood trees, such as ash, beech, birch, and elms, with common spruce trees in the cross glens lying towards Benachie. The Don, at the bridge of Keig (Castle Forbes), is 374 feet above sea level.

On the north bank of the river, from a little above Keig to the Inver of Mossat, the plantations are those upon the estates of Whitehaugh, Airley, the Braes of Forbes, and Edinbanchory. On Whitehaugh a good deal of the older woods have been cut down; but in most cases the ground has been either brought into cultivation or replanted with Scots firs and larch, with hardwood trees in the lower ground along the valley, which are in a thriving state. On Airley the chief plantation is that upon a hill of considerable altitude; but neither do the Scots firs nor the larch promise to attain to anything more than shelter. On the Braes of Forbes the belts and clumps of Scots firs and larch, mixed with some hardwood trees and spruce on the lower ground, have been well laid out for shelter, and promise to be of considerable value as timber. Within the past few years the high hills lying between the Don and the Correen range of hills, have been to a considerable extent planted up with Scots firs and larch, but as these young plantations are almost entirely isolated from the older plantations on the lower ground, it will be many years before the trees come to cover the ground on which they are planted.

The plantations of Edinbanchory extend for several miles along the north bank of the river, up to and along the water of Mossat, and high up the southern slopes of "King William's Cairn." They consist of pretty well-grown Scots firs and larch, with a mixture of ash, common spruce, and oaks, near the house of Littlewood, with alder bushes and some oak and spruce trees along the banks of the river.

On the south bank of the river, opposite to Whitehaugh, are the plantations and policy-grounds of Haughton, and higher up those of Breda and the woods of Brux. South of the latter property are the plantations of Cushnie, Craigievar, and Corse; and eastward of Craigievar lie the plantations and woods of Tillyfour, Lynturk, Tonley, &c., which occupy the south-east portion of the vale.

The plantations of Haughton, and particularly those along the river and in connection with the mansion-house and grounds, consist of fine full-grown Scots firs and larch, with some fine specimens of the silver fir and ornamental hardwood trees in the policies. On Breda, and along the water of Leochel, the plantations consist of some old larch belts and clumps of Scots firs along the valley, and on the lower hill-tops by Wellhouse and Asloon; and old hardwood trees by the manse and church of Alford. The Don, at the influx of the water of Leochel, is 434 feet above sea level.

The Brux plantations chiefly lie along the river, opposite to Edinbanchory, and upon the north and west slopes of Callievar (1746 feet), and, along with some outlying plantations on the borders of Towie and Cushnie, cover a pretty large extent of ground. They entirely consist of Scots firs and larch trees of various ages, and as they are confined too much, either to the valley of the river or to the hill-tops, they afford but little shelter to a rather high-lying exposed district. The Cushnie plantations of Scots firs and larch are also confined to a few clumps on the hill-tops, and belts on the lower ridges, with some rows of old plane and ash trees around the old mansion-house.

The outlying plantations on the estates of Craigievar and Corse consist of clumps and belts of Scots fir and larch, with some spruce trees, and seem to have been laid out for dividing the farms and for shelter. The older plantations and woods of Craigievar lie to the west of the castle, and in the grounds there are some good specimens of old beech and ash trees, and in the valley below a considerable extent of ground has recently been planted up, chiefly for ornament. The Corse plantations of mixed Scots firs, larch, and spruce trees, are well grown. They surround the old castle, and afford considerable shelter to the cultivated ground in the top of the valley. At the old mansion-house of Hallhead, which stands high (950 feet), and to the south-west of Craigievar, there is a fine specimen of an old beech tree which measures 12 feet in girth a few feet from the ground.

On the estates of Tillyfour, Lynturk, and Tonley, which lie along the south side of the vale of Alford, and on the northern slopes of the Corrennie range of hills, the Scots fir plantations, along with some clumps of mixed Scots firs and larch on Carnaveron and Tillychetly, which lie more into the centre of the vale, cover a large area of ground, and are of great value. The greater portion of the trees in these plantations have arrived at maturity, and of late years a good deal of the timber has been cut down.

In the grounds of Tonley House, and by the church and manse of Tough, and at Whitehouse, there are some good specimens of old beech, ash, and elm trees, mixed with common spruce, and all combined are of a highly ornamental character. After passing the wooded gorge of the river at Edinbanchory and Brux, and the influx of the water of Mossat (536 feet), we come to the finely wooded and highly cultivated valley of Kildrummy and Auchindoir. On the estate of Auchindoir, and surrounding the mansion-house of Clova, the plantations are extensive and of various ages. On the east slopes of the hills which form the base of the "Buck o' Cabrach," and along the waters of the Bogie and Mossat, the Scots fir and larch trees in the older plantations have mostly arrived at maturity, but the larch trees seem to be decaying fast. On the lower ground the mixed Scots fir and larch plantations, which were formed about twenty-five years ago for ornament and shelter, and in laying out the extensive grounds which now surround the residence, are all in a very thriving state, so are also the belts and clumps of larch, common spruce, and ornamental hardwood trees (which were formed to a considerable extent in pretty deep moss), along the approaches to the mansion-house.

On the Kildrummy estate since 1836, several thousand acres have been planted on the lower slopes of the west hills, the Glascul, and on Ardhuncart, with small clumps of Scots fir on the lower grounds. On the higher ground the trees seem to have been mixed Scots firs and larch in equal proportions; and in the den, the natural birch mixed with ash and common spruce, with some ornamental clumps of planting and beech hedges near the old castle, have a very pleasing effect, and they are all very thriving. The Don opposite to the manse of Kildrummy is 552 feet above sea level, and the Buck of the Cabrach, on the north-west of the parish, 2368 feet.

Passing upwards, and through the Den of Kildrummy, we come to the parishes of Towie and Glenbucket. In the parish of Towie, which chiefly lies on the right bank of the river, planting barely exists. At the mansion-house of Glenkindie, which stands on the left bank of the river, the grounds have been laid out by belts of hardwood and hedge-row trees, with some outlying clumps of Scots fir, larch, and spruce trees in the glens and lower slopes of the hills on both sides of the river. At mains of Glenbucket there are a few old ash trees with stunted birch and juniper bushes along the valleys; but otherwise Glenbucket parish is destitute of trees. The Don, at the influx of the Bucket, is 782 feet above sea level, and Ben-newe is 1874 feet.

A few miles above the confluence of the Bucket are the plantations and well-wooded grounds of Castle Newe in Strathdon, where, and within the past ten years, considerable additions have been made to the policies, by an alteration of the leading line of road along the strath, and the formation of new belts and clumps of pines, larch, and hardwood trees of various kinds. The lower slopes of the Lonach range of hills, which lie along the north side of the strath, are well wooded, and the low range of hills on the south, from the Deskrie water to Glencarvy, are well covered with full-grown Scots firs and larch. In the valley of the river, at Castle Newe, Colquhouny, and by the manse and church, there are some fine old ash, plane, and elm trees; but, looking to the appearance of the younger trees of that description, the soil and climate seem to favour the growth of Scots firs. High up Glen-noghty (the waters of which fall into the Don at the manse of Strathdon), and at the mansion-house of Auchernach (1250 feet), there are some plantations of mixed Scots fir and larch; but here they do not seem to thrive.

About one mile above the finely-wooded gorge and old bridge of Poldhulie, and on the north bank of the river, stands the fine mansion-house of Candacraig, surrounded by thriving plantations of Scots firs and larch, with some fine old Scots firs, larch, and hardwood trees in the policies. On the high hills north of Candacraig, and east of Edinglassie, and on the high ground south of the river, the larch trees do not seem to be thriving, evidently suffering from the effects of a rigorous and severe climate.

A little above Candacraig, and on the north side of the strath, is Glen-ernan, with the mansion-house of Forbes Lodge, and the old mansion-house of Edinglassie, in the top of the glen. The Scots fir and larch plantations cover both sides of the glen, and extend far up some of the lower hills, and join those of Candacraig on the east. In the grounds of both mansions there are some fine old hardwood trees of various kinds and evergreen shrubs, and along with the well-wooded slopes of the hills, Glenernan is one of much beauty, both natural and artificial. From

Inverernan upwards to Corgarff, by Colnabaichen, Skellater, the church and manse, and old Castle of Corgarff to Cockbridge and Allargue, which is the highest bridge on the Don, the plantations of Scots firs and larch are confined to the valley of the river, and to some clumps of old Scots fir at Skellater and Allargue; but altogether they do not occupy much space. From Bridge of Allargue to the source of the river—a distance of about five miles—trees or bushes of almost any kind cease to grow.

The Don at Inverernan is 964 feet above sea level, and at Allargue 1254 feet.

Returning to the valley drained by the Ury and its tributaries, the Lochter, the Gaudy, and the Shevach.

Near to the junction of the Ury with the Don at Inverurie, stands the stately mansion of Keithhall, surrounded by extensive young plantations, and some fine old ash, elm, black gean trees, and spruce firs. These young clumps of planting are composed of almost every kind of forest tree, now blend with the older woods by the manse and church of Keithhall on the east, and with those on Boynds, north of the valley, they form a very pleasing landscape viewed from the west. North-east of Keithhall, the higher hill-tops of Thornton, Barra, and Bourtie, have recently been planted up with Scots firs and larch, and along with some older clumps of Scots firs on Barra and Bourtie, and the finely wooded grounds of Meldrum House, and the thriving young plantations and beech hedges of Tulloch, this rather high-lying district of the country is well sheltered. On Bethelnie, Balcairn, and in the valley west of Meldrum, the rich agricultural land is well sheltered by thorn hedges and hedge-row trees. Westward by Daviot are the old woods of Mounie, Glack, and Inveramsay. These woods chiefly consist of old Scots fir, larch, and spruce trees with belts of hardwood and old ash trees at Glack, with some thriving mixed plantations along the Ury at Inveramsay. A little above Inveramsay are Pitcaple Castle and Logie Elphinstone. The woods of Pitcaple are now very much confined to the ornamental grounds along the river, to which, and within the past few years, considerable additions have been made. The woods of Logie Elphinstone lie along both banks of the Ury, and, along with the lower portion of the Pittodrie plantations, cover a large area of ground. The Logie woods contain a pleasing variety of old Scots firs, larch, and spruce trees, with some very ornamental beech, elm, ash, and other hardwood trees, and beech hedges. To the north-east of Logie are the woods and plantations of Wartle and Rothmaise, and to the west of Wartle are those on Freefield. In the grounds of Wartle there are some fine old ash trees with thriving clumps of young spruce and other trees of a very ornamental description; and the whole is surrounded by extensive young plantations and out-lying clumps of Scots firs and larch. To the north-east of the mansion-house a considerable extent of pretty deep moss has been planted up, where the common spruce and *Abies nigra* have made very satisfactory progress. The woods upon Freefield consist of some clumps and belts of mixed hardwood trees around the mansion-house, and clumps of Scots fir and larch by the manse of Rayne, and some outlying plantations bordering on the well-wooded grounds of Blackford, on the eastern slopes of Tillymorgan hill, 1140 feet above sea level.

Above Old Rayne the plantations in the valley of the Ury are those upon the estates of Newton, Williamstone, and Sheelagreen. In the grounds of Newton House there are some fine specimens of old Scots firs mixed with thriving hardwood trees, spruce, and larch. At the Bridge of Ledikin, and in other outlying plantations, the mixed clumps of larch and spruce are very valuable as well as ornamental. The plantations and policies of Williamstone are rather tastefully laid out by clumps and belts of Scots firs mixed with larch, spruce, and hardwood trees, all in a very thriving state; and although young, they are valuable for the shelter they afford to the adjoining somewhat bare district. The woods of Sheelagreen are those lying on both sides of the glens of Foudland, and high up the slopes of the hills. They consist of Scots firs, larch, and some spruce trees of considerable age, but of no great value as timber, the larch trees on the higher ground being only stunted bushes.

In this district beech hedges seem to thrive remarkably well, but many of them are but indifferently attended to.

On the water of Shevach, near to Insch, and on the estate of Drumrossie, there are some thriving young plantations of Scots firs, larch, and spruce trees, with some old ash trees and shelter belts at Overhall and at Dunnydeer, but otherwise the valley, from the village of Insch to the Foudland hills, is almost destitute of trees. North of Dunnydeer, and in the valley of the Shevach, and on the south-west slopes of the west Foudland hills, the plantations on the estate of Wardhouse cover a large area. These woods are of various ages, and consist of Scots fir, larch, and spruce trees, with a mixture of ash, elm, and birch, in the ornamental grounds around the residence and in the valley below. They have been well laid out both for ornament and shelter, and now are of great value.

The Wardhouse railway station, which is close to the policies, is 584 feet above sea level, and the west Foudland hills, north of the mansion-house, 1517 feet.

Along the water of Gaudy, another tributary of the Ury, which falls into the parent stream in the grounds of Logie Elphinstone, the plantations are of a limited extent. At the old mansion-house of Westhall there are some fine old ash, plane, elm, birch, oak, and walnut trees, with some belts of young Scots firs and larch, and on the opposite side of the valley there are some young plantations of Scots firs on Ryehill, and old hardwood trees at Oyne and Buchanstone. In Premnay and at the church there are some old ash trees, and westwards along the valley the old thorn hedges are numerous, but as they have been allowed to *run riot*, they are almost useless for any purpose. At the old mansion of Lickleyhead there are some fine old beech trees, with the remains of old apple trees and yews. Higher up the "back of Benachie" there is a remnant of an old Scots fir wood, which yielded timber of good quality and of fair size, but now they are mostly cut down. Within the past few years, and in connection with this old plantation, and on some isolated hill-tops on the north side of the valley, several young plantations of Scots firs and larch have been formed, but in such exposed situations trees will not grow until some portions of the lower ground be planted up to rear shelter. From Premnay along the Gaudy, for several miles, there are no plantations worthy of notice till we reach the source of the stream in the parish of Clatt and the plantations surrounding the mansion-house of Knockespock, which is situated on the northern slopes of the Correen range of hills (1702 feet). These plantations consist of Scots firs, larch, and some spruce trees in the corries of the hill. They are mostly full grown, but of little value as timber. Some younger plantations of pines and larch, mixed with hardwood trees, surrounded with some beech and thorn hedges on the lower ground, are thriving. At the church and manse there are some old ash trees, but altogether the valley of the Gaudy is bare, and for want of a more appropriate description of it, Churchill's line—"Far as the eye can reach no tree is seen"—is literally a true one.

Third, The Valley of the Ythan.—On the north bank of the river from the sea to Ellon (where the river is only four feet above high-water mark), the planted ground is of no great extent. At Auchmacoy House there are some belts and clumps of hardwood trees mixed with spruce and larch; and at Pitlurg House some clumps of ash, elm, and elder bushes, with old thorn hedges dividing many of the farms and along the public roads, and an old chestnut tree at Waterton. At Ellon Castle and the village there are some fine old hardwood trees, and recently, to the west and north-east of the castle, a number of small clumps and belts of planting have been formed of various kinds of forest trees, which seem to be in a thriving state. About six miles to the north-east of Ellon are the plantations on Aquharney, which cover a large extent of rather high-lying ground, only partially sheltered on the west by the bare hills of Dudwick (562 feet), and fully exposed to the north and easterly gales, and within four miles of the sea without almost any intervening shelter. These plantations consist of Scots firs, larch, and some beech, and as their growth has been but slow, much further progress seems rather doubtful. On Turnerhall, which lies about four miles to the north of Ellon, the plantations of mixed Scots firs and larch on the Kinharrachies and on Hilton, with the thorn hedges at the latter place, seem all to be in a thriving state. A little further north, and on the east bank of the Ebrie water, stands the mansion-house and woods of Arnage. They consist of pretty old Scots firs and larch trees in clumps and belts around the residence, with shelter belts along the valley, for which purpose they are of considerable value. The younger plantations of spruce and some hardwood trees seem to be in a thriving state. Some miles north of Arnage, and at the source of the Ebrie, stands the old mansion-house of Nethermuir. About thirty years ago the trees around this residence consisted of only a few old ash trees, thorn hedges, and some hedge-row trees. It is now surrounded by thriving plantations of Scots firs, larch, spruce, and various kinds of hardwood trees, poplars, and willow. On the low moss ground, which lies to the east and south of the house, the common spruce, ash, birch, and poplar, have made most remarkable and satisfactory progress, and altogether promise well.

Returning to the south side of the river and to the seaboard parishes of Foveran and Belhelvie. At Foveran House there are some old hardwood trees, with thorn hedges and willow bushes, all over the valley to the west. At the mansion-house of Mennie, and by the manse and church of Belhelvie, and at Balmedie House, there are large clumps and belts of hardwood trees, such as ash, alder, elm, and beech trees of stunted growth. Further inland, at Pottertown, Belhelvie Lodge, Ardo, and Tillery, the Scots fir and larch plantations cover a considerable extent of ground, and with some old thorn hedges and elder bushes, afford partial shelter to a rather high-lying district. On the higher ground, to the west of some thriving young plantations on Tillycorthie, are the Balnakettle and Pittrichie Scots fir woods, which are of considerable extent, and of great value for shelter. Lower down the valley are the old plantations and woods of Udny Castle, Tolquhon, and Pitmedden, with some young clumps of Scots firs and larch on the lands of Pitmedden, Craig, and Cultercullen, and clumps of old hardwood trees at Monkshill, Logierieve, and Rosebank. At Udny Castle the old hedgerows are grown to trees, and are highly ornamental as well as useful for shelter. The younger plantations in the valley south and east of Udny church consist of spruce, larch, and hardwood trees, are thriving, and with the numerous thorn hedges along the public roads, the district is well sheltered. At Esslemont House, which stands on the south bank of the river, about a mile above the village of Ellon, the plantations are mostly confined to those around the mansion. They consist chiefly of Scots firs in clumps and belts, with some larch and hardwood trees. Westward of Esslement, and along the valley by Ardlethen, there are some clumps of Scots fir and larch, with some hardwood trees and hedge-rows westwards by the village of Tarvas. In the parishes of Tarvas and Methlic, and on the south banks of the river, are the very extensive woods and policies of Haddo House. Those surrounding the park and policy grounds consist of Scots firs of great age, partially mixed with spruce and hardwood trees of various kinds, with fine specimens of the lime tree, the *Pinus Cembra*, and other foreign pines of an ornamental description, and, including the park and policies, comprehend an area of 1000 acres. North of the river from Tanglang ford to the water and Braes of Gight (celebrated as being the maternal property of George Gordon, Lord Byron), the country is well wooded. The Scots fir and larch trees along the valley of the river are mostly full grown, and at the old house of Schivas there are some fine hardwood trees. The river at the confluence of the Ebrie is 32 feet above sea level, at the Bridge of Methlic it is 70 feet, and at the Braes of Gight 93 feet.

From the Braes of Gight upwards to Fyvie church, a distance of between three and four miles, the course of the river is hemmed in by steep barren braes, till we reach the haughs of the Lewes and the finely-wooded grounds of Fyvie Castle. The extensive woods on the north and east of the castle, towards the Muirs of Fyvie, are composed of fine full-grown Scots firs and larch, with an agreeable variety of hardwood and spruce trees, bordering and dispersed throughout the policies. On the west of the valley, by Rothiebrisbane, and in the lower part of the Den of Rothie, the old Scots fir and larch woods cover a large area of ground, and are of great value. The river at Fyvie Castle is 136 feet above sea level.

West of the Lewes, and along the upper part of the Den of Rothie, with its small tributary stream, are the extensive plantations and woods of Rothie-Norman, Kinbroon, and Blackford, with some outlying plantations on the hill-tops of Rothie and the Follas. These plantations are all composed of Scots firs and larch, some of them old, and most of them come to maturity. The younger ornamental planting on Rothie-Norman are mixed with spruce and hardwood trees, with some beech hedges, appear to be in a thriving state. Northward along the valley of the river, from the Fyvie Castle woods to the old house of Towie, the steep braes on the east are covered with thriving young Scots firs and larch. At Towie, where the water shears as between the Ythan and the Doveran, the plantations consist of a few clumps of Scots fir, larch, spruce, and hardwood trees. From

Towie, upwards through Auchterless, the plantations are mostly young and of small extent. They are situate upon Seggat, Thomaston, and at the mansion-house of Knockleith; the older Scots fir and larch plantations being those upon Hatton, Templeland, and Badenscoth. At the old house of Hatton there are some old Scots firs and belts of hardwood, and old ash trees by Moat and the church, with old thorn hedges on Knockleith and Cushnie, and shelter belts of larch on Netherthird. On the higher ground at Badenscoth there are some clumps and belts of old Scots firs and thriving beech hedges along the leading roads, but from Badenscoth upwards to the wells of Ythan, on the north Foudland range of hills, a distance of about five miles, arboriculture does not occupy five acres of ground.

The Ythan at the old house of Towie is 174 feet above sea level.

Fourth, The Valley of the Ugie.—Within one mile of the sea, and at the old castles of Inverugie and Ravenscraig, the steep banks of the river on both sides have been planted up with ash, elm, plane, and willow trees, mixed with Scots fir and larch at and above Ravenscraig. At Ellishill, the Balmoors, Mount Pleasant, Springhill, and westward by Downiehills, Buthlaw, Dens, and Cairngall to Longside, the country has been subdivided by thorn hedges and hedge-row trees, with numerous clumps of hardwood, consisting of ash, elm, plane, alder, and willows. The thorn hedges are very numerous, and many of them old and neglected, consequently are not in a thriving state. The hardwood trees generally are old, and the oldest have not attained the height of 15 feet, and afford but little shelter to the rich agricultural land which constitutes the "Howes o' Buchan."

On the Blackhills, a high ridge which runs inland from the Stirling Hill (260 ft.), industrious attempts have been made for many years in succession to get forest trees to grow, but hitherto without much success, however, from the failure to get numerous kinds of trees to grow on this high, bleak, isolated hill, within two miles of the northern sea; it does not follow that the common and hardier sorts would not have grown, if to the hill ground selected for planting, had been added as much of the lower ground as would have formed a sufficient base to rear shelter in course of time, for the stunted bushes which now barely cover the hill. West of the Blackhills, and on the lower ground by Dens, Ludquharn, and Kinmundy, to the Skelmuir hills, there are some clumps of Scots firs, old ash and plane trees, and thorn hedges. At Kinmundy, the plantations of Scots fir, mixed with larch, spruce, and hardwood trees, cover a considerable extent of ground. Around the mansion-house there are some fair specimens of oak, ash, and plane trees, with many thriving, well-kept beech and thorn hedges all over the district.

South of the Blackhills, and between the mossy hills of Cruden (465 feet) and the sea, is the valley of Cruden, and Slains Castle, where old thorn hedges, ash, elder, and willow bushes only exist, and afford but little shelter to a rather bare district of the county, which is very much exposed to the prevalent north-easterly gales.

North of the Ugie, and in the sea-board parishes of St Fergus, Crimond, Lomnay, Rathen, and Fraserburgh, the farms are to a considerable extent subdivided by neglected thorn hedges. At Rattray House the grounds and approach to the mansion are ornamentally laid out by belts and clumps of hardwood trees, and well-kept beech and thorn hedges. In Crimond, several years ago, some belts and clumps were laid out and planted chiefly with hardwood trees, but their growth has been slow. At Haddo and the manse there are some old ash trees, and on Hillhead a few clumps of hardwood and willow bushes. At the old house of Logie there are some old firs, ash, and alder trees and willow bushes.

The grounds of Crimonmogate House are of considerable extent, and well laid out, in which there are some well-grown hardwood trees, with some thriving young plantations, and fine, well-kept beech hedges. The plantations of Cairness, Craigellie, Knowsie, and Mormond House conjoined, cover a pretty extensive space of ground. The Cairness woods comprehend almost every kind of forest tree, all mostly full grown, and very ornamental and valuable for shelter to the residence. Those upon Craigellie are of small extent, but very ornamental. The Mormond House (Cortes), plantations are situate on the north-east shoulder of Mormond Hill, and occupy rather a conspicuous position. The policies are well wooded and very ornamental, and contain fair specimens of Scots firs and spruce, well mixed with hardwood trees of various kinds. To the north and east of Mormond Hill are the woods of Memsie and Auchiries, which chiefly consist of Scots firs of no great extent, but of considerable value for shelter.

At Philorth House, which stands on low ground within two miles of Fraserburgh, there are some fair specimens of common spruce and silver firs, oak, ash, chestnut, lime and plane trees, with clumps and belts of younger hardwood trees and evergreen shrubs tastefully laid out, with thriving, well-kept thorn hedges and hedge-row trees all over the valley. Mormond is 775 feet above sea level.

Returning to the valley of the Ugie, and to the north of the village of Longside, is the large old plantation of Ardlawhill, which consists of Scots firs, larch, and some common spruce. This plantation originally covered several hundred acres, but of late years a good deal of the timber has been cut down. The trunks of the trees, both of the Scots fir and the larch, along the west and north borders of the plantation, are remarkably, and in many instances fantastically distorted, no doubt from the effects of heavy snowfalls lodging upon the tops of the young trees while their stems were flexible. Many cases similar to this are to be met with all over Aberdeenshire, but certainly they occur more frequently in the lower than in the upper parts of the county.

Westwards of Longside, for about two miles, the valley of the river is bare, excepting the thorn and beech hedges on Auchtydonald, and some belts of young spruce and hardwood trees at Mintlaw connected with the woods and policies of Pitfour and Aden. The plantations and park of Pitfour extend from near Mintlaw on the east, to near Brucklay on the west, and Strichen on the north, and including the Bruxie plantations and the "Old White Cow," cover several thousand acres. These woods contain every description of forest tree usually cultivated in this country. In the plantations on the high ground on Bruxie, the White Cow, and Cairnorchies, the larch have been extensively planted, but little success has attended them. In the lower parts of the White Cow, and in the mixed plantations in the valleys, they have succeeded better; but all seem to have acquired a very aged appearance, arising either from the effects of climate, soil, and seasons, most probably a combination of causes not easily accounted for.

The Scots firs, mixed with other forest trees, in large and small groups, cover a considerable space, but few of them have obtained any marked superiority either in size or quality of timber. The common spruce and silver firs, along with the oak, elm, beech, plane, horse chestnut, and gean trees, are very fine specimens of their species. The younger plantations of hardwood trees, and clumps of common and black spruce, are very thriving, and seem well designed to fill up the blanks made in the older plantations. Of late years a considerable extent of ground has been partially cleared of timber, both within the policies and outlying plantations, and most probably fully as much has been planted. But it falls to be noticed with regret by all who admire arboriculture, that much money has been lost in this district, as well as in many other districts of Aberdeenshire, in useless attempts to form young plantations, as the young plants have been either totally destroyed or so much injured by the roe and fallow deer, hares, and rabbits, that little hope is left of their ever becoming trees. Closely adjoining the policies of Pitfour on the south are those of Aden, which extend along the north bank of the river from near Mintlaw up to the village of Old Deer. They consist of pretty well-grown Scots firs mixed with larch and common spruce in the outlying plantations. The trees surrounding the mansion-house and on the steep banks of the river consist of fine full-grown larch, oak, ash, plane, and lime trees, with some fair specimens of the Huntingdon willow. The outlying plantations are those upon the hill-tops of Biffie, and consist of Scots firs and larch, of no great extent or value but for shelter. South and west of the villages of Old Deer and Stuartfield are the Scots fir and larch plantations on Knock and the Crichies. Those on Knock are pretty well grown, and here there are some fine beech hedges along the public roads. On Crichie the plantations are now confined to a few belts of hardwood trees and thorn hedges, and on West Crichie to some old hardwood trees at farm-yards, young hardwood plantations in the Den, and clumps of Scots firs and larch upon the hill-tops. On the hill-tops towards New Deer, and in the Den of Old Maud, there are some clumps of Scots firs and larch; but from the diminutive size of these clumps, and the high position of the ground, the trees have only a starved existence. Along the valley of Ugie, and southwards by the village of New Deer, are the extensive young plantations surrounding Brucklay Castle (which stands on the north bank of the river), and with the older woods on Artamford, Culsh, and Fedderate (which lies to the west of the Brucklay woods), they cover a large extent of ground. Excepting the old hardwood trees at Brucklay, and the old Scots fir and larch woods on Artamford, the whole has been planted within the past forty years, and consist of pines, larch, common spruce, and silver firs, poplars and willow, well-disposed of as to soil and situation. The Scots firs and larch do not seem to thrive, but some of the hardwood trees, spruce, and silver firs, poplars, and willows are very thriving. North of the castle a considerable breadth of pretty deep moss has been planted. On this ground the spruce, ash, willow, &c., planted about forty years ago, are well-grown trees; those planted about twenty years are also well-grown trees, and those planted a few years ago promise well, and the whole may be said to be in a very thriving state.

On the north branch of the river or Little Ugie, the plantations consist of some hardwood scrubs at the old house of Kininmonth, with some thorn hedges and belts of old Scots firs at Park. On the north division of Pitfour there are some clumps and belts of Scots fir and larch on the hill-tops, with thorn and beech hedges along the public roads. Higher up the stream is the village of Strichen, which stands in the valley south-west of Mormond Hill, and opposite to the village is Strichen House and grounds. The old Scots fir and larch plantations surrounding the policies cover a large area, but of no great value as timber. In the grounds there are some fine specimens of Scots firs, larch, common spruce, and silver firs, with some old oaks, limes, beech, ash, and alder trees, with old thorn hedges, rowan, and old ash trees, at farm-yards. Recently a considerable extent of ground along the south face of Mormond Hill has been enclosed and planted up with various kinds of forest trees, and with the additions formerly made to the plantations and policy-grounds, the amenity of the district has been much improved.

Between Strichen and the sea at Old Pitsligo there are few plantations. At the old mansion of Aberdour there are some thorn hedges and old hedge-row trees, with clumps and belts of ash and spruce at the Boyndlies, and old scraggy trees at Pitsligo ruins and the church. Westwards by New Aberdour and Auchmedden, towards the hills of Byth (750 feet), there are some clumps and belts of spruce, ash, plane, alder, and willows; and southwards, by New Pitsligo, there are some thriving plantations of mixed Scots firs, larch, and spruce, but on the higher ground (650 feet) they are only stunted bushes. In the Den, which divides the village of New Pitsligo, the hardwood trees are very thriving; so are also the plantations on the lower ground, which are of mixed spruce, ash, willow, and alder. In this district such trees thrive on the mossy soils in sheltered places.

Fifth, The source of the Doveran is in the hills west of the Buck of Cabrach, and its course is north-easterly through the parish of Cabrach, Glass, Cairnie, Huntly, Turriff, and King Edward, in Aberdeenshire, and of Rothiemay, Inverkeithny, and Gamrie, in Banffshire.

The lower part of the river has its course through the finely-wooded grounds of Duff House and Montcoffer, and by the tastefully laid out grounds and plantations of Eden in King Edward, which extend along the right bank of the river from near the Montcoffer woods and by the old Castle of Eden up to the picturesque Den of King Edward and old ruin by the manse. The Eden plantations are mostly young, and have been well laid out both for shelter and ornament. They consist of Scots firs and larch, with a fair mixture of spruce, ash, and elms, surrounded in many places by thriving well-kept thorn hedges. Higher up the Den of King Edward the steep banks in many parts have been planted with mixed hardwood trees, which are thriving. Eastwards by Balmaad, Fishery, and Millseat, there are some outlying clumps and belts of old Scots firs and larch, and a few thorn hedges, affording but little shelter to a high-lying cultivated district. North and eastwards of Millseat, and on the moors towards Byth, several hundred acres have been planted, chiefly with Scots firs, but they have made little progress. At Byth House the plantations are pretty old, and are mostly confined to those in the vicinity of the residence. They consist of Scots fir, spruce, larch, and alders—some of them well-grown trees; and situated as they are, "'midst muirs and mosses mony," they form a pleasant oasis in the desert. To the south-west of Byth and the extensive tract of muirland hills called Corse Gight, are the plantations of Auchry, Craigstone, and Delgaty, in the neighbourhood of Turriff. The Auchry plantations, along with some belts and hedges at Millfield, do not occupy much space. Those upon Auchry consist of some clumps of old Scots firs and larch upon the higher ground by the village of Garmond, and thriving young plantations of spruce and hardwood trees on the lower ground around the mansion-house. On Craigstone the old Scots fir woods around the castle contain some fine specimens, and along with the old ash trees the grounds are well timbered and very ornamental. East and west of Craigstone the mixed clumps of Scots firs and larch afford considerable shelter to a rather high-lying cultivated district. The Delgaty plantations extend from the Doveran below Turriff to the Auchry plantations in Monquhitter, and cover a large area of ground. The older woods, being those more immediately connected with the residence of Delgaty Castle, consist of old Scots firs, spruce, ash, beech, and alder trees, all of mature growth, but of no great value except for shelter and ornament; the younger plantations being the hardwood planting on the braes of Ashogle, the Scots fir and larch woods on Wraes and Whiterashes, and the mixed plantations north of the Delgaty woods and along the roads leading from Turriff to Banff and Monquhitter. The younger Scots fir trees generally, all over the district, are not in a thriving state, and the larch of all ages are either dead or dying. The oak, ash, elm, and plane trees, with some birch, thrive pretty well along with some very thriving beech hedges. But the common spruce, the black American, and the common silver fir have far overtopped all other trees, and are very thriving. About two miles south of Turriff, and in the valley drained by the Idoch, are the old Scots fir woods and mixed plantations surrounding Hatton Castle. In the older woods around the residence there are some fine old Scots firs, larch, and hardwood trees; but on the higher ground, on the east of the mansion and on the west of the valley on Gask, neither do the Scots firs nor the larch in the younger plantations appear to be in a thriving state, but for shelter they are very valuable.

On the right bank of the Doveran, above Turriff, are the plantations of Muiresk, Ardmiddle, Scobbach, and Laithers. The Muiresk plantations seem to have been laid out chiefly for ornament and shelter to the residence, and consist of well-grown Scots firs, larch, and spruce trees, with a mixture of ash, elm, and birch trees, with birch scrub on the river banks, and some very well kept thorn hedges. On Ardmiddle the plantations of Scots firs and larch are young, and appear to have been laid out for shelter. On Scobbach, the belts and clumps of Scots firs and spruce, mixed with hardwood trees, are also young, and along with the ornamental plantations at the mansion-house, which stands close to the river, are very thriving. On Laithers, the chief plantation lies along the valley of the river and on the Craig-brae, which lies parallel thereto. This extensive plantation contains some fine old Scots firs, larch, and spruce trees of great value. In the younger plantations of Scots firs and larch on the higher ground towards Auchterless, both on Laithers and other smaller properties, the Scots firs have made but little progress; but the larch altogether are only stunted, dead, and dying bushes.

Passing upwards through the parish of Inverkeithny, in Banffshire, we come to the finely wooded valley of Forgue and Drumblade. In Forgue the Bognie plantations extend from the Doveran, a little below Mayen, to the north Foudland range of hills, and cover a large extent of ground. At the old houses of Bognie and Frendraught, there are some fine specimens of beech, elm, ash, and alder trees, with silver firs, larch, yew, chestnut, and gean trees at the latter place. At Bognie-Brae, Couland, the Raich, and Comisty hills, the Scots firs and larch plantations are of various ages, condition, and quality—of considerable extent, but not of great value except for shelter. Part of the Bissethills, on the north Foudlands, were planted with seeds (Scots fir) as an experiment, but as the surface of the ground was only tufted, partially covered with heath, the ground was not very suitable for such nursery work, and few of the seeds, that is comparatively few, made their appearance, and those that did had little or no shelter to assist them to establish themselves on a high bleak hill not half covered with vegetation, and on thin black moorish soil, overlying a hard substratum of slaty clay.

At Haddo, which lies low in the vale of Forgue, there are some fine old Scots firs and spruce trees, and ornamental hardwood trees along the banks of the stream up to the church, where there are some fine old ash trees. At Boynds-mill, Place-mill, Drumblair, and Templand there are numerous clumps of hardwood, hedge-row trees, and old thorn hedges, with clumps of spruce and larch on Drumblair, and young Scots firs and larch on Templand. In the Den of Largue, the spruce, Scots firs, and larch trees are well grown and very ornamental. On Balgavendy, Aucharnie, Glen Ythan, and Auchaber the plantations of Scots firs and larch cover a considerable extent of rather high-lying ground, and are very valuable for shelter. On Corse there are some clumps of Scots firs and larch, with hedge-row trees around the residence; and at the manse and church of Drumblade and Troupsmill, some old ash trees, with some clumps of Scots firs and larch at Newton Garioch, and higher up the valley some clumps of stunted larch trees at Commaleggie.

On the south-west of the valley of Forgue is the Foreman Hill (1140 feet), which is planted chiefly with larch on its east, south, and west faces, and on the southern slopes of the hill are the woods of Cobairdy. The mixed plantations on the lower slopes are well-grown trees, and in the grounds around the mansion-house there are many fine old hardwood trees and thriving beech hedges. South of Cobairdy are the mansion-house and well wooded grounds of Lessendrum, and westward of Lessendrum the woods of Kinnoir. In the grounds of Lessendrum there are some fine old ash, plane, and beech trees, surrounded by thriving plantations of Scots firs and larch, well mixed with spruce trees in the lower parts. Closely adjoining these plantations, and to the south of Cobairdy, is an extensive young plantation of Scots firs, which seem to have succeeded pretty well, considering the tenacity of the soil and the low damp situation; but reasonable doubts may well be entertained as to the future success of Scots firs on such ground.

On the right bank of the Deveron, west of the Foreman, are the plantations of Avochy (where the river is 310 feet above sea-level), and southwards to Huntly are the plantations on the Corse of Kinnoir. The Avochy plantations consist of pretty well grown Scots firs and larch, with old beech, ash, and alder trees at the residence, and birch and hazel bushes along the banks of the river. The woods on Kinnoir consist of old Scots firs and larch, and occupy a long ridge on the east banks of the Deveron and the Bogie, from Avochy to Huntly, and are valuable for shelter. On the west or left bank of the Deveron are the plantations on the lower part of the Huntly estates, and higher up are the finely wooded grounds of Huntly Lodge, through which the river flows. The outlying plantations chiefly consist of Scots firs of various ages, with some thriving plantations mixed with spruce and hardwood trees. The grounds of Huntly Lodge and Old Castle contain some fine specimens of old Scots firs and of the silver fir, with some large oak, elm, and beech trees, and some fine specimens of walnut and gean trees. A little above Huntly, and on the same side of the river, stood the old Scots fir plantation of Dumbenan, where most of the trees have been cut down, but the ground remains well covered with alders and birch.

About two miles north of Huntly is the Beinn forest, the top of which is 1050 feet above sea-level. This forest was planted by the late Duke of Richmond in 1839–40, and, within the compass of one ring fence, contains an area of about 2600 acres of mixed Scots firs and larch. On the eastern division two-thirds of the plants were larch, and on the west or higher division two-thirds of the plants were Scots firs. On the south and more sheltered portions of the ground, and in the hollows, ash, beech, plane, and elms were planted along with common spruce. In subsequent years, and on the western spurs of the hill, considerable additions were made to this noble forest, so that altogether it must now cover an area little short of 3000 acres. The original cost of planting and enclosing the Beinn proper did not exceed twenty shillings an acre, forest trees being at that time considered cheap, and the fences, being rickle dyke and earth sunk of a very primitive description, did not cost much.

To the north of Binhall, and near to the manse and church of Cairney, there are a few clumps of firs and hardwood trees, with hedges and small clumps upon Newton, with natural birch on the pasture braes, and old ash and rowan trees at farm-yards. Westwards through the parish of Glass there are only a few plantations of Scots firs and larch near to the church, with natural birch and alders along the valley of the river and in Glenmarkie, with some old ash and plane trees. In the parish of Cabrach there are only a few bushes at the manse.

Returning to Strathbogie, the waters of which fall into the Doveran in the grounds of Huntly Lodge. In the valley of the Bogie, from Huntly to Rhynie, a distance of about ten miles, the plantations consist of a few clumps of various kinds of forest trees at farm-yards; thorn hedges dividing several of the farms, and along the principal roads; some clumps of hardwood trees by the church and manse of Gartly, with alder and willow bushes on the banks of the stream, and birch scrub on the lower slopes of the hills.

About three miles above the church at Gartly, and on the east of the valley, are the woods of Leithhall and those of Druminor, also on the east side of the valley opposite to the village of Rhynie. In the grounds of Leithhall there are a few old Scots firs, larch, and spruce trees, with some old oaks, ash, elm, and beech trees, with a few black poplars and Huntingdon willows. At the manse and church of Kinnethmont and southwards there are a few clumps of Scots firs and larch, but they afford very little shelter to the wide, undulating valley which lies between the sources of the Gaudy and the Shevoch. The plantations of Druminor are chiefly those around the residence, and consist of well-grown Scots firs and larch, mixed with hardwood trees and common spruce. Higher up, towards the Correen Hills, several clumps of Scots firs and larch have been laid out for shelter, but as yet the trees have made little progress. Along the banks of the Bogie the alder bushes and the natural birch are to be found in great abundance in the valley, and struggling up the steep braes. West of Rhynie village, and within the past ten years, several clumps of Scots firs and larch have been formed on the tops of some of the lower hills, and should they succeed the amenity of the district will be much improved.

Above Rhynie, by Glenbogie Cottage, Westhills, Craig, and

Clova, the steep banks of the stream are well covered with thriving Scots fir and larch plantations, and with the natural birch trees which abound everywhere in the strath, it is well wooded. On Westhills the young belts, which were made for shelter, with some outlying plantations of Scots firs and larch on Marchmar, seem to be very thriving.

On the estate of Craig the plantations are confined to those around the mansion-house, and those by the old church of Auchindoir. In the Den of Craig there are some fine specimens of common spruce and silver firs, ash, elm, beech, and birch trees; and in the surrounding plantations there are some fine old Scots firs, larch, and birch trees. Higher up the Bogie, and on the east slopes of the Buck of Cabrach (2368 feet), the plantations are upon the estate of Auchindoir, and were noticed as falling under the fluvial territory of the Don.

FOREST TREES.

In order to render the foregoing report a little more useful and interesting, the reporter has thought it desirable to add the following abstract of the principal forest and other trees throughout the county, and where such are to be found :—

The Scots fir (*Pinus sylvestris*).—The best are to be found,—

On Deeside.—At Culter, Drum, Skene, Midmar, Kincardine Lodge, Aboyne, Ballater, Abergeldie, Invercauld, and Mar Lodge.

On Donside.—At Seaton House, Parkhill, Kenmay, Cluny, Monymusk, Haughton, Auchindoir, Newe, and Candacraig; and on the Ury at Newton and Wardhouse on the Shevach.

On the Ythan.—At Haddo House, Fyvie, and Rothie Norman.

On the Ugie.—At Kinmundy, Pitfour, Strichen, and Philroth.

On the Doveran.—At Craigstone, Hatton, Laithers, Huntly Lodge, and on the Bogie at Craig.

The larch (*Larix europæa*).—The best are to be found,—

On Deeside.—At Culter, Drum, Midmar, Learney, Ballogie, Finzean, Blelack, Aboyne, Ballater, Abergeldie, Invercauld, and Mar Lodge.

On Donside.—At Craibstone, Kemnay, Cluny, Monymusk, Haughton, Breda, Candacraig, and Edinglassie, and Wardhouse on the Shevach.

On the Ythan.—At Haddo House and Fyvie.

On the Ugie.—At Aden and Strichen.

On the Doveran.—At Hatton, Laithers, Frendraught, and Cobairdy; and Leithhall and Craig on the Bogie.

The spruce fir (*Abies excelsa*).—The best are to be found,—

On Deeside.—At Skene, Echt, Learney, Aboyne, Blelack, Ballater, Abergeldie, and Invercauld.

On Donside.—At Fintray, Kemnay, Monymusk, Manar, Castle Forbes, Craigievar, and Newe; and Newton on the Ury and Wardhouse on the Shevach.

On the Ythan.—At Haddo House and Fyvie.

On the Ugie.—At Pitfour, Strichen, Mormond House, Cairness, and Philorth.

On the Doveran.—At Delgaty, Laithers, Huntly Lodge, and Craig.

The silver fir (*Abies pectinata*).—The best are to be found,—

On Deeside.—At Hazelhead, Culter, Midmar, Ballater, Invercauld, and Mar Lodge.

On Donside.—At Craibstone, Monymusk, Haughton, and Breda; and at Glack on the Ury and Wardhouse on the Shevach.

On the Ugie.—At Pitfour, Strichen, and Philorth.

On the Doveran.—At Delgaty, Frendraught, and Huntly Lodge; and on the Bogie at Craig.

The yew tree (*Taxus baccata*).—The best are to be found,—

On Deeside.—At Culter.

On Donside.—On the Gaudy at Licklyhead.

On the Ythan.—At Ellon.

On the Doveran.—At Frendraught, and in the Bogie at Leithhall.

The holly tree (*Ilex Aquifolium*).—The best are to be found,—

On Deeside.—At Culter, Drum, Midmar, Campfield, Ballogie, Finzean, and Aboyne.

On the Ythan.—At Ellon.

The ash tree (*Fraxinus excelsior*).—The best are to be found,—

On Deeside.—At Kingswells, Echt, Drum, Kincardine O'Neil, Aboyne, Tarland, Abergeldie, and Invercauld.

On Donside.—At Craibstone, Parkhill, Straloch, Kinkell, Meldrum, Wartle, Overhall, Clatt, Kemnay, Fetternear, Castle Fraser, Cluny, Tonley, Craigievar, Glenkindy, and Newe.

On the Ythan.—At Ellon and Auchterless.

On the Ugie.—At Kinmundy, Aden, Pitfour, Brucklay, Strichen, and Philorth.

On the Doveran.—At Frendraught, Cobairdy, Huntly Lodge, and Leithhall, and Craig on the Bogie.

The alder tree (*Alnus glutinosa*).—The best are to be found,—

On Deeside.—At Culter, Drum, Echt, Skene, Birse, Aboyne, Invercauld, and in Glen Cluny.

On Donside.—At Seaton, Kinnellar, Tonley, and Breda.

On the Ugie.—At Pitfour, Crimonmogate, Cairness, and Strichen.

On the Doveran.—At Byth, Delgaty, Bognie, and Huntly.

The birch tree (*Betula alba*).—The best are to be found,—

On Deeside.—On Culter, Skene, Echt, Finzean, Aboyne, Ballater, Birkhall, Abergeldie, and Invercauld.

On Donside.—At Craibstone, Tillyfour, Cluny, Monymusk, Whitehouse, Haughton, Kildrummy, Glenkindie, Newe, and Edinglassie.

On the Ugie.—At Pitfour and Strichen.

On the Doveran.—At Delgaty, Forgue, Huntly, and on the Bogie at Craig.

The aspen tree (*Populus tremula*).—The best are to be found,—

On Deeside.—At Aboyne, Ballater, and Invercauld.

On Donside.—At Castle Forbes, Kildrummy, Glenkindie, and Edinglassie.

The beech tree (*Fagus sylvatica*).—The best are to be found,—

On Deeside.—At Countesswells, Echt, Aboyne, and Abergeldie.

On Donside.—At Craibstone, Parkhill, Straloch, Balbythan, Meldrum, Wardhouse, Premnay, Cluny, Hallhead, Craigievar, Balfluig, and Edinglassie.

On the Ythan.—At Ellon, Udny, Schivas, and Fyvie.

On the Ugie.—At Pitfour, Strichen, and Philorth.

On the Doveran.—At Gask, Bognie, Lessendrum, and Huntly Lodge.

The chestnut tree (*Castanea vulgaris*).—The best are to be found,—

On Deeside.—At Culter, Echt, Skene, Aboyne, and Ballater.

On Donside—At Keithhall, Monymusk, and Tonley.

On the Ythan.—At Waterton and Haddo House.

On the Ugie.—At Pitfour.

The horse chestnut (*Æsculus Hippocastanum*).—The best are to be found,—

On Deeside.—At Culter, Echt, Skene, Aboyne, and Invercauld.

On Donside.—At Craibstone, Keithhall, and Balfluig.

On the Ythan.—At Haddo House.

On the Ugie.—At Pitfour.

The lime tree (*Tilia europæa*).—The best are to be found,—

On Deeside.—At Culter, Echt, Aboyne, and Birkhall.

On Donside.—At Cluny, Tonley, and Breda.

On the Ythan.—At Ellon and Haddo House.

On the Ugie.—At Aden, Strichen, Cairness, and Philorth.

On the Doveran.—At Frendraught and Leithhall.

The oak tree (*Quercus Robur*).—The best specimens are to be found,—

On Deeside.—At Culter, Skene, Drum, Aboyne, and Ballater.

On Donside.—At Craibstone, Monymusk, Cluny, Tonley, Haughton, and Newe.

On the Ythan—At Fyvie.

On the Ugie.—At Kinmundy, Aden, Pitfour, Strichen, and Philorth.

On the Doveran.—At Delgaty, Huntly Lodge, and Leithhall.

The sycamore, or plane tree (*Acer Pseudo-Platanus*).—The best are to be found,—

On Deeside.—At Drum, Finzean, Aboyne, and Abergeldie.

On Donside.—At Keithhall, Fetternear, Cluny, Cushnie, Glenkindy, and Newe.

On the Ythan.—At Ellon, Rothie, and Towie.

On the Ugie.—At Pitfour, Oldmaud, Philorth, and Crimond.

The elm tree (*Ulmus montana*).—The best are to be found,—

On Deeside.—At Countesswells, Echt, Drum, Aboyne, Birkhall, and Invercauld.

On Donside.—In the neighbourhood of Aberdeen, Fintray, Keithhall, Manar, Monymusk, Tonley, Breda, Newe, and Edinglassie.

On the Ugie.—At Pitfour, Cairness, and Philorth.

On the Doveran.—At Cobairdy, Huntly Lodge, and Leithhall.

The gean tree (*Prunus Cerasus*).—The best are to be found,—

On Deeside.—At Bieldside, Culter, Drum, Echt, Campfield. Aboyne, Dee Castle, Ballater, Birkhall, and Glengairn.

On Donside.—At Keithhall, Westhall, Cluny, Monymusk, Whitehouse, Breda, and Newe.

On the Ugie.—At Pitfour and Strichen.

On the Doveran.—At Frendraught, Huntly Lodge, and Leithhall.

The rowan tree (*Pyrus aucuparia*).—The best are to be found,—

On Deeside.—At Countesswells, Midmar, Dee Castle, Glenmuick, Glengairn, and Invercauld,

On Donside.—At Kinnellar, Tillyfour, Pittodrie, Breda, and Newe.

On the Ugie.—At Pitfour and Strichen.

On the Doveran.—At Templand, in Forgue, Drumblade, Huntly, and in Strathbogie.

The Poplar Tree, the Lombardy, the Black Italian, and the Grey Poplar.—The best specimens of these trees are to be found at Echt and Aboyne on Deeside; at Manar, Tonley, and Glenkindy on Donside; at Aden, Crimonmogate, and Strichen on the Ugie; and at Frendraught, Leithhall, and Craig on Doveran side.

The Huntingdon Willow (Salix alba).—Good specimens of this tree are to be found in the neighbourhood of Aberdeen, and at Murtle, Echt, Aboyne, and Birkhall on Deeside; at Fetternear, Castle Forbes, and Edinglassie on Donside; and at Logie, Aden, and Philorth on the Ugie.

The Walnut (Juglans regia).—The best specimens of this tree are to be found at Craibstone and Kenmay on Donside, and Westhall on the Gaudy, and at Huntly Lodge on the Doveran.

FORESTS.—The more elevated mountains and glens along the south and west borders of Aberdeenshire, from the Forest of

Birse to Benmacdhui, are now almost, but not entirely, set apart for the antlered monarchs of the glen, and from Benmacdhui to the Braes of Aldivalloch in the Cabrach, partly so. But it is very difficult to get anything like correct statistics as to the area under deer in Scotland, for this reason that we know in many cases sheep are not altogether excluded from these glens and mountains; hence the difficulty arises in forming a correct estimate of the area exclusively set apart for deer. There is no doubt that the Aberdeenshire mountains are peculiarly well adapted for the purposes of breeding and rearing deer, because they are only divided by imaginary lines from the extensive deer forests in Banff, Inverness, Perth, and Forfar shires, which circumstance alone adds very much to the value of the mountainous districts of this country for deer farming; and as such pays the proprietors better than sheep, it is likely the question—deer farming *v.* sheep farming—will remain an open one.

FORESTRY.—Forestry as a science does not appear to be much studied in Aberdeenshire, or if it be, it is not much practised; and this may arise from several causes apart from any want of a proper knowledge of forest culture, but chiefly from the fact that the axe of the woodman is oftener called into action than the pruning-hook of the forester, and probably fully as often, as the exigency of many cases would fairly appear to warrant or justify.

Thick planting—that is, from 3 to 3½ feet apart—seems to be the rule all over the country, and this system, no doubt, in a cold climate, has beneficial effects so far, if the young trees were early and judiciously thinned and pruned in order to let them have the benefit of atmospheric influences to aid them in strength. But as these operations are generally delayed till the trees have attained fifteen and often twenty years' growth, they are then indiscriminately handled, and sometimes the best trees are cut down in order to meet at least the expense attending the operation.

The thinnings of Scots fir and larch plantations of from fifteen to twenty years' growth are only fit for pit-props, paling, and such like purposes, and naturally enough a proprietor who has spent L.100 in planting looks for some return from his outlay, because if he had put out his L.100 at 3½ per cent. compound interest, in twenty years it would have brought him L.199. But let us fall back upon the planting speculation, and assuming that it has thriven and cost little or nothing to manage, the thinnings at the end of twenty years would certainly have brought him L.2 an acre free, besides leaving a good crop of timber upon the ground, his property much improved, and thereby increased in value. The cultivation of timber is a slow process, but it is sure, and, except under very adverse circumstances, it will eventually pay.

In thick plantations of mixed Scots firs and larch, and where proper thinning has been too long delayed, the result is that the larch trees have been stimulated into premature growth, so that when they are opened up, many of them are found "that from the crown of the head to the sole of the foot there is no soundness in them." Again, in young plantations mixed with all sorts of forest trees, such as the ash, the elm, the larch, and the poplar, in the earlier stages of their growth, generally overtop the firs and the spruce, and from the want of early thinning and pruning, these many-headed trees and their straggling branches often whisk away the bristles (needles) from the top shoots of their softer, although harder associates, thereby killing down the weaker, and not unfrequently the stronger trees, and those which are likely to prove most profitable to the proprietor.

The distribution of plantations and woods all over Aberdeenshire is very unequal, and the selection of ground for planting on many large estates seems to have been too much a matter of chance, consequently the many failures which are to be met with need excite no surprise. But as this is a question which more immediately affects the owners of large properties, it is for them to consider whether a better distribution of plantations over their estates would not only have a considerable influence in improving the climate, but add much to the value of their agricultural land. Should, however, the present agitation about game damaging agricultural crops continue, it is to be feared that objections would arise from the same source as to the formation of young plantations for shelter.

SOILS, &C.—*Dee.*—Along the valley of this river, and on the banks of its tributaries, the soil is chiefly gravelly loam. In Skene, Lumphanan, and Cromar, the loam is of a better quality, and all resting upon granite, quartz, and limestone rock, and gravel beds.

Don.—Along the valley of this river, from Aberdeen to Inverurie, the soil is good loam. In the vales of Monymusk and Alford the soil is more or less mixed with decomposed granite and small stones. In Kildrummy a considerable portion of the soil approaches a clay loam, and in Strathdon the soil is of a lighter loam, pretty freely mixed with small stones. Along the vale of Ury, and on Gaudyside, the soil is pretty good loam. From Aberdeen to Kildrummy granite is to be found everywhere. In Kildrummy the sandstone rock crops out, and in Glenbucket and Corgarff limestone rock is worked, with serpentine by the church of Strathdon, and ironstone in Corgarff. On the Ury, gneiss, clay, and roofing-slate abounds; and on the Gaudy, granite, serpentine of a coarse quality, and clay slate.

Ythan.—Along the valley of this river, clay and good loam exists along its whole course. The soil along the Ebrie is not so good, and near to the source of the stream it is of an inferior quality. Gneiss, clay, and roofing-slate exists on the Ythan, and limestone rock of an inferior quality is to be found on the Ebrie.

Ugie.—Along the valley of this river good loam exists, more or less mixed with small stones; and in the sea-board parishes, excepting portions of Rathen and Fraserburgh, the soil is clay. Large tracts of peat moss are to be found in Cruden, Longside, Old Deer, St Fergus, Lonmay, Strichen, Aberdour, and other parishes. Red granite is worked in Peterhead and Cruden parishes, blue at Longside, and the grey at Strichen and New Pitsligo, with limestone rock at Rattray-head and in the parish of Fraserburgh.

Doveran.—Along the valley of the river, and on the banks of its tributaries, every variety of soil is to be found; good loam exists in the Turriff district, and in Forgue, Huntly, Cairney, and in Strathbogie. Sandstone is worked at Turriff and Rhynie, limestone in Cairney and Glass, clay-slate in Turriff, Forgue, and Gartly, with roofing-slate in the latter parish, with grey granite and drift boulders east and west of Huntly.

The tops and slopes of most of the secondary class of mountains, such as Mormond, Foudland, Benachie, the Buck of Cabrach, Wester Morven, and others, are covered with peat-moss, the debris of primeval forests. The higher mountains being those of the Grampian range, Braeriach and Benavon are bare and bleak, and in many places covered with huge granite blocks, disintegrated and stratified rocks; are intersected by wild glens, rocky precipices, and lonely mountain tarns, with their rugged slopes but barely covered with heath and other alpine plants far above the upper zone of forest culture.

General Remarks.—The sea-board parishes are those of Old Machar, Belhelvie, Foveran, Slains, Cruden, Peterhead, St Fergus, Crimond, Lonmay, Rathen, Fraserburgh, Fyvie, Pitsligo, and Aberdour; and from the half perispheric shape or contour of the coast, which radiates about twenty miles from the church of Methlic, and from the want of high hills and woods, the climate, although genial, is rather cold and humid. In several of these parishes, thorn hedges abound, along with belts and small clumps of hardwood trees of stunted growth; but in many parts they are bare, and shelter is much wanted for protecting the agricultural crops from the north and easterly gales which occasionally sweep across this large extent of exposed country.

Scots fir trees succeed in most soils throughout the county, up to the height of about 1500 feet above sea-level, excepting most of the sea-board parishes. The larch succeeds in most places where trees do grow, and on moist clay, gravel, loam—all sorts of soils—till the roots begin to penetrate the subtratum, and if it be hard tilly or moor-bound, the roots decay, and trunk rot commences. Ulceration afflicts the larch tree of all ages, and is very prevalent all over the county. It is generally believed to arise from early spring frosts checking the flow of sap, causing the sap vessels to rupture, and blotches break out, after which they became covered with cryptogamic growths. Old ash, plane, and beech trees are to be found in many places where the younger trees of the same species do not now appear to thrive. The common spruce and silver firs succeed best in deep, moist, or ordinary friable soils, in sheltered places better than in exposed situations. The oak tree occupies but a small space in our forests, and the best specimens are to be found on rich clay soils, on gravel or rock. The birch tree, both natural and planted, grows in mountain, moor, and bog, and along with the alder tree and the elder bush are never touched by that implacable enemy of most trees—the rabbit. The elm, the lime, and the horse chestnut grow freely in rich soils on open subsoils. Good specimens of beech, thorn, and holly hedges are to be met with. On the very gravelly soils on Deeside the beech and common thorn does not thrive; but in the upper valley of the river the birch, mountain ash, aspen, holly, blackthorn (sloe), and the hazel, are indigenous. The juniper and bramble bush, the dog-rose, and wild raspberry are everywhere to be met with in great abundance.

The pests of our pine forests prevail only to a small extent, but they do exist in the shape of the weevil, which attack the roots, the beetle the top shoots, and the caterpillar the needles; but neither of them seem to have at any time made much progress or done much damage. The larch, besides the constitutional complaints before referred to, is attacked by the *Adelges* Lar., and the *Eriosoma* Lar., insects which do much harm to both young and old trees alike. Otherwise our woods and ornamental plantations are remarkably free from disease, except what is brought about by the climatic influences of an early spring or a late autumn.*

ON THE COMPARATIVE PRODUCTIVENESS AND GENERAL QUALITIES FOR USE AND KEEPING OF THE DIFFERENT KINDS OF SWEDISH, YELLOW, AND WHITE TURNIPS, GENERALLY USED IN FIELD CULTURE.

By GEORGE BRUCE, Keig, Aberdeenshire.

[*Premium—Ten Sovereigns.*]

FORMERLY in the northern counties farmers' returns were almost entirely from the grain crops, but now it is on the rearing and feeding of cattle that they have principally to depend. In this district on most farms the number of cattle that are now fed is double what it was twenty years ago, and some of our more advanced farmers, with the use of a little artificial food, are sending three times as many to the butcher. How to select and grow the most productive and suitable crops for feeding stock becomes thus a question of the utmost importance, and of all crops cultivated for that purpose none have yet been found to equal or even compare with the turnip. We may safely say, therefore, that from the time the turnip as a field crop was introduced a new area dawned on agriculture.

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* The altitudes given in the foregoing report, where not otherwise stated, are so many feet above the Ordnance Survey datum line.

There are numerous varieties of turnips differing greatly in many important points; and when we consider that the Scotch farmer has to feed his cattle in the house during seven or eight months in the year, it is evidently of the utmost consequence that he should select the varieties that are best suited for the season of the year in which they are to be used, as well as most productive and profitable.

It is with a view to obtain correct information with regard to these points that the experiments which are hereafter detailed were carried out, and especially to ascertain the varieties most suitable for early use, an important point which seems to have been almost entirely overlooked by former experimenters, it being quite out of the question to suppose that an "Imperial," an "Excelsior," or any green or purple-topped variety will suit all soils and all climates, and come equally to early maturity.

The following experiments were made on a farm twenty miles inland, and 380 feet above the sea-level. The soil in both experiments was a loamy clay of very middling quality. It had been recently drained and subsoiled. The rotation is five-course:—1868, oats with grass seeds; 1869, grass pastured; 1870, grass pastured; 1871, oats; 1872, experiments in Tables I. and II., and owing to the unusual fall of rain the crop did not come to the usual average weight:—

Rainfall	1872,	25·20 inches.
„	1871,	17·82 „
Excess in 1872 over 1871	=	7·38 inches.

The experiments made in 1873 are given in Tables III. and IV. All the varieties were topped, and fully half an inch of top was left on each bulb. Very great loss is often occasioned by topping or tailing too closely, thereby wounding or bleeding the turnip, which when stored induces gradual decay.

The swedes and yellow-fleshed varieties of seeds were procured from Messrs Alexander Bruce & Son, Keig, and were all grown from transplanted stocks. The white-fleshed varieties were bought from Messrs Carter, Dunnett, & Beale, London. All kinds were true.

Tabulated plan of experiments made in 1872 and 1873, showing the comparative productiveness and general qualities for use and keeping of the different kinds of swedish, yellow, and white turnips generally used in field culture:—

TABLE I.

Showing the comparative Productiveness on 10th December 1872 of the different kinds of Swedish Turnips as hoed at different widths.

Variety of Turnip.	Manure.			Cost of Manure.	Width between drills.	Date of sowing.	Date of first thinning.	Date of second thinning.	Distance left between bulbs.	Weight per imperial acre.
	Farm-yard.	Bone Meal.	Super-phosphate.							
				£ s.					In.	t. c. lbs.
Kinaldie's Bronze-Top,	20 yds.	5 cwt.	3 cwt.	7 0	28 in.	28th May.	20th June.	4th July.	12	16 2 10
Do.									14	18 12 4
Skirving's Purple-Top,									12	15 3 22
Do.									14	17 14 8
Sheppard's Bronze-Top,									12	16 18 9
Do.									14	17 19 26
Green-Top,									12	16 2 4
Do.									14	15 1 19

TABLE II.

Showing the comparative Weight on 10th December 1872 of the different kinds of Yellow Turnips.

Variety of Turnip.	Manure.			Cost of Manure.	Width between drills.	Date of sowing.	Date of first thinning.	Date of second thinning.	Distance left between bulbs.	Weight per imperial acre.
	Farm-yard.	Bone Meal.	Super-phosphate.							
				£ s.					In.	t. c. lbs.
Old Meldrum Golden Yellow,	20 yds.	4 cwt.	3 cwt.	6 10	26 in.	6th June.	28th June.	12th July.	10	17 3 21
Aberdeen Bullock Yellow,										16 12 10
Tweeddale Purple-Topped Yellow,										16 1 25
Fosterton's Hybrid,										16 3 10
Early Field Yellow,										13 1 24

TABLE III.

Showing comparative Weight on 1st May 1873 of the different kinds of Yellow Turnips taken from the same field as those in Table II.

Variety of Turnip.	Manure.			Cost of Manure.	Width between drills	Date of sowing.	Date of first thinning.	Date of second thinning	Distance left between bulbs.	Weight per imperial acre.
	Farmyard	Bone Meal.	Superphosphate							
				£ s.					In	t. c. lbs
Old Meldrum Golden Yellow,	20 yds.	4 cwt.	3 cwt.	6 10	26 in.	6th June	28th June.	12th July.	10	16 15 8
Aberdeen Bullock Yellow,										14 0 4
Tweeddale Purple-Topped Yellow,										15 1 6
Fosterton's Hybrid,										Failure.
Early Field Yellow,										Failure.

Remarks and Observations on Experiments.

Purple-Topped Swede.—The leading kind of this variety is Skirving's. It is purple-topped, globular in shape, and rather long in neck. It has a tendency to get rather coarse, which, however, is considered by some growers to be an advantage, as it can be topped without damaging the bulbs. Being productive and hardy, it is held in high esteem by the farmers in Aberdeenshire. The "East Lothian" is the only other purple-top very much patronised. It is something like Skirving's, but comes sooner to maturity, while it does not stand the frost so well. Is not, therefore, such a favourite as Skirving's.

Green-Topped Swede.—At least three kinds of this variety are to be met with. The old green-top, which grows well into the ground, and stands the winter well, but is not very productive; an improved green-top, which grows farther out of the soil; and Hartley's short-topped swede, which is the neatest green-top yet introduced, and in heavy soils yields a large crop.

Bronze-Topped Swede.—Sheppard's is one of the best bronze-topped swedes cultivated. For bulk and solidity it cannot be excelled, though it is apt to get rather "casticky." Good light soils suit it best. It is often called green-topped, but the true variety has a distinct bronze, though not nearly so deep in colour as Kinaldie's variety. The latter has a neater head and less leaves than the Sheppard's, and in good soils is very productive.

Green-Topped Yellow Turnip.—There are several kinds of this turnip. The Old Meldrum golden yellow (so named because it is very much cultivated near the village of Old Meldrum) is undoubtedly the best green-topped yellow grown. It is at least twice the size of the old golden yellow, but retains the same neat head and golden-coloured bottom, and has a fine globular shape. No variety can compare with it for growing well into the soil, and is invaluable to the farmer, as it is easily protected by the plough from frost and vermin. Another variety of the green-top is the Aberdeen bullock yellow. It has a paler green top and lighter yellow bottom than the Old Meldrum variety. It grows far above the soil, and to appearance it is very productive, but does not weigh well, nor stand the frost. It has, however, a redeeming quality. It is not difficult to please with soil. The other leading variety of green-top is the early field yellow. It is very much esteemed for its rapid growth and early maturity. It also is the best turnip to sow where the braird has been destroyed.

Purple-Topped Yellow.—We often meet with three different kinds of this turnip: the old red-topped yellow, the Aberdeen purple-topped bullock yellow, and the Tweeddale purple-topped yellow. The red-topped yellow is not, however, to be compared with the other two, being smaller in size. The Aberdeen variety grows better into the soil, and is more globular than the Tweeddale, but both grow a heavy crop. Light and mossy lands suit them best.

Fosterton's Hybrid is oblong shaped, with light yellow flesh, and bulks well, but does not stand the frost.

White-Fleshed Varieties.—There are at least four leading varieties of globe turnip grown in the north of Scotland: the Pomeranian, large in size and perfect in shape, is the greatest favourite; the Norfolk red, not so productive as the former, but suits light and exposed soils; the greystone or mottled, and green globe. The green globe is hardy, but does not come to size like the greystone. In favourable seasons the latter is very productive, but in dry seasons it is apt to run to seed, and is also very difficult to keep true to its original type.

In concluding our remarks, we may draw attention to Table I., where it is seen that swedes grow a heavier crop when hoed 14 inches than if hoed 12 inches.

The yellow and white turnips, again, as seen by Table IV., should not be hoed over 10 or 11 inches apart, as they are apt to split and decay when they grow to large sizes. As seen by Table IV., the early field yellow is the most productive and best variety for early use, and we are surprised so many farmers grow so large a proportion of globes. No doubt a small percentage is useful for the young stock, there being such a weight of tops on the globe turnip (see Table IV.), but the feeding qualities cannot be so good as the yellow-fleshed varieties.

But again, as will be seen (Table IV.), the early field yellow has decayed so much by the first of November, that no more

TABLE IV.

Showing the comparative Weight of the leading varieties of Yellow and White Fleshed Turnips at 1st September, 1st October, and 28th October 1873.

Kind of Turnip.	Manure.				Width between drills.	Date of sowing.	Date of first thinning.	Date of second thinning.	Width between plants.	Specific gravity.	1st Weighing.		2d Weighing.		3d Weighing.	
											Weight per Imperial Acre, 1st September.		Weight per Imperial Acre, 1st October.		Weight per Imperial Acre, 28th October.	
	Farmyard.	Bone Meal.	Superphosphate.	Cost of Manure							Bulbs.	Heads.	Bulbs.	Heads.	Bulbs.	Heads.
											t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.
Early Field Yellow .	20 yds.	5 cwts.	3 cwts.	£7	26 in.	9th June	1st July	19th July	12 in. 10 „	·87	23 1 2 27 8 1	7 6 2 7 19 3	26 5 0 30 10 2	2 13 2 3 6 1	24 3 1 27 12 1	1 17 3 2 0 2
Orange Jelly									12 in. 10 „	·92	17 18 2 23 11 3	6 6 1 6 19 2	18 13 1 25 0 1	2 6 3 2 19 2	19 2 1 25 17 2	1 6 1 1 13 3
Pomeranian White Globe									12 in. 10 „	·82	16 1 3 21 8 1	10 6 0 15 18 1	24 7 2 28 8 3	6 19 4 8 18 1	29 15 2 31 11 3	6 4 2 7 11 3
Norfolk Red Globe .									12 in. 10 „	·86	14 16 1 17 19 2	8 19 1 12 11 2	22 16 3 27 2 1	5 19 3 7 6 2	26 11 1 30 0 3	5 7 3 6 14 1
Greystone Globe . .									12 in. 10 „	·84	14 4 1 20 3 2	11 5 1 13 18 2	25 6 3 29 6 2	7 9 1 9 1 0	32 3 0 33 12 2	6 12 2 7 16 3
Fosterton's Hybrid . .									12 in. 10 „	·98	15 6 2 19 2 3	9 16 0 10 19 2	21 18 2 24 19 0	6 12 3 7 4 2	23 19 1 27 18 3	6 8 4 7 1 2
Aberdeen Bullock Yellow									12 in. 10 „	·84	18 6 2 17 3 1	9 19 1 11 18 2	18 19 3 24 6 1	6 10 1 7 9 0	22 12 0 27 17 2	6 1 1 6 16 2
Tweeddale Purple-Topped Yellow									12 in. 10 „	·92	12 8 2 17 18 3	8 17 1 11 5 2	18 8 1 24 11 1	6 4 3 7 19 2	22 1 3 26 13 1	5 14 2 6 17 0
Old Meldrum Golden Yellow									12 in. 10 „	·88	13 1 2 16 19 2	7 12 3 9 6 0	19 18 2 22 1 3	5 19 1 6 12 3	22 10 3 25 13 1	5 14 0 6 6 3

should be sown of that variety than can be used by that time, and we prefer the Aberdeen bullock yellow, the Tweeddale purple-topped yellow, or Fosterton's hybrid, for use from that time to Christmas—the hybrid being by the time the early field yellow is used almost as productive as the globe, and having a specific gravity (see Table IV.) nearly equal to a swede.

As will be seen from Table II., the Old Meldrum golden yellow is proved to be as productive in December as any other variety, and from that time we prefer it to any other kind of yellow. By Table III. this variety is proved to be the best keeping yellow turnip we have, and where the soil is unsuitable for growing swedes, or when the season is wet, this variety of yellow can be grown, which is nearly equal to a swede for feeding cattle, and for lambing ewes is indispensable.

ON TREES, CHIEFLY CONIFERS.

By Alexander Graham Speirs of Culcreuch, Fintry, Glasgow.

The following communication is intended to show the growth of some coniferous trees at Culcreuch, at an elevation of 360 feet above the sea-level. In the case of the conifers the following trees are the produce of home-grown seed—*Abies Douglasii, Pinus Monticola,* and *Cupressus Lawsoniana.*

1. My largest *A. Douglasii* was planted forty years ago; it is perfectly healthy, about 60 feet high, and at 3 feet from the ground upwards of 8 feet 10 inches in circumference. This tree bears cones in alternate years, and I have numerous plants from the seed. Some are now betwixt 20 and 40 feet high, perfectly vigorous and well-shaped, though planted in exposed situations. The seedlings I do not remove till the spring after their germination. I find that they thrive well in the open ground, though I have observed some of the more vigorous young plants are hurt by severe frost. This I attribute to the want of snow to protect them, as in their native habitat.

2. I have also raised *Pinus Monticola* from native seed, but the squirrels save me the trouble of gathering the cones, of which they seem very fond. My largest tree is upwards of 60 feet high, perfectly symmetrical from ground to apex. Last year it made a double shoot, and will now, I fear, grow laterally.

3. An *Abies Menziesii,* planted same year, is now higher and larger than either of the preceding named trees. I only once saw a couple of cones on it, but cuttings grow freely and in good shape.

4. My largest *Araucaria imbricata* was planted in 1847, and is now 25 feet 6 inches high; girth at root, 2 feet 7 inches; at 3 feet, 1 foot 10 inches.

5. Deodar (*Cedrus Deodara*), planted in 1842. This seems to be of the variety called *robusta*. It bears cones which fall off after first hard frost; cones were first noticed in 1858. It is now 38 feet high; girth at ground 4 feet 10 inches; at 3 feet it is 3 feet 10 inches.

6. *Cryptomeria Lobbii*, planted in 1850; quite hardy, and a desirable plant. Height, 24 feet 2 inches; girth, 3 feet at ground; 1 foot 9 inches at 3 feet up.

7. *Cryptomeria japonica*, planted 1852; height, 15 feet; girth at base, 3 feet, and 2 feet 3 feet higher. This variety is also hardy, foliage very dense, and of a good colour.

8. *Wellingtonia gigantea*.—My first was planted in 1852; it is only about 20 feet high, but the circumference at the root is 5 feet, at 3 feet it is 2 feet. It must be noted the tree is planted in bad, poor soil, and in a very exposed situation, yet it has never suffered from frosts or any storm. It had a few cones in 1870, as had *Pinus excelsa*.

9. *Pinus Pallasiana*, planted 1842; height, 36 feet; girth at ground, 7 feet 3 inches, and at 3 feet 5 feet 9 inches. This is a coarse-growing tree in habit; though taller, not unlike the *Pinus Mugho minor*; it seems suited for an exposed situation, or even a lawn tree.

10. *Taxodium sempervirens*.—This is a charming plant; it seems quite hardy, for our usual winters do not hurt it. I would strongly advise amateurs to consider the beauty of the foliage, and the elegant growth (like feathers) of the young shoots. It was planted in 1846, and now measures 30 feet in height, and girths at the ground 6 feet 6 inches; at 3 feet up, 5 feet.

11. *Picea cephalonica*, planted 1846; height, 31 feet; girth at root, 4 feet 10 inches, and at 3 feet is 3 feet 7 inches. This is a handsome tree, well worth cultivation. I think there are two varieties—the one has all the young growths of a light green colour; the young shoots of the other are a light reddish brown. This last is more tender than the other, but I incline to think both should be grown, being of dense growth and good shape.

12. *Cupressus Lambertiana*.—This beautiful tree is rather delicate for this place and climate. My plant is 17 feet high, and though some of its unripened growths have been hurt by severe winters, its top shoot has never failed.

13. *Picea Nordmanniana*.—This beautiful tree thrives to a wish; planted in 1852, it is now 26 feet high, 3 feet 1 inch in circumference at root, and 1 foot 11 inches at 3 feet up. This tree cannot be cultivated too freely.

14. *Picea grandis*, planted 1856, is 14 feet 6 inches high. I do not feel certain of this climate being suitable to this plant. Last summer seems to have hurt the leading shoots.

15. *Pinus Benthamiana* and *macrocarpa* I may put together:

struggling growths are their characteristics. I do not admire them; their timber may be valuable, but the trees do not meet my taste as ornamental.

16. *Abies Albertiana* is nearly allied to the *Abies canadensis.* My best plant, raised in 1856, is 19 feet high, and if pruned close to the stem might pass for a fishing-rod stuck into the ground; it has a bad habit of turning up its branches. I have been obliged to tie down the points. The *Picea cephalonica* also has this fault.

17. *Pinus ponderosa,* planted 1833, is 42 feet high, and at ground 5 feet 10 inches in circumference; at 3 feet it is 4 feet.

18. *Cedrus atlantica,* planted 1852, is 20 feet 6 inches high, 3 feet 4 inches in circumference at ground, and 2 feet 4 inches at 3 feet. This seems hardy; is like both *C. Libani* and *C. Deodara,* but differs from both.

19. The *Cupressus Lawsoniana* bears freely, and I have raised numerous young plants from home-grown seed.

20. The *Pinus Koraiensis* showed cones when only 5 feet high.

21. *Pinus Laricio corsica,* planted in 1825, height 59 feet, circumference at base 5 feet 10 inches; at 3 feet, 4 feet 6 inches; thriving and healthy.

Some few years since a friend gave me a few seeds, which I took to be *Pinus Pinea,* but which he assured me were gathered in close proximity to the cedars of Lebanon. The plant seems tender, but does not die.

I might add largely to this list, but will only mention, as above, plants that have been proved for years. Also, that the *Quercus Cerris* has now got to a tree-like size, and bears acorns which the squirrels devour, but sometimes lose, and I get seedlings in the grass round the parent trees. The *Q. coccinea* thrives well, but does not fruit. The *Cupressus disticha* grows very slowly; and for some years the *C. religiosa* has stood our winters as well as the *Cupressus torulosa.* The *Libocedrus tetragona* lives, but scarcely grows; the *Arthrotaxus selaginoides* I have also kept for some years. *Retinosporas* of sorts do well, and *R. obtusa* and *R. pisifera* improve in looks as they increase in height. *Paulownia imperialis* also lives, and grows but slowly—its large leaf is worth having. I am now trying the *Aralia Sieboldii,* as Veitch reports it is hardy.

ON EXPERIMENTS FOR ASCERTAINING THE ACTUAL ADDITION OF WEIGHT TO GROWING OR FATTENING STOCK BY THE USE OF DIFFERENT KINDS OF FOOD.

By Alfred Harwood, Belstead, Ipswich, Suffolk.

[*Premium—Twenty Sovereigns.*]

The primary object of the experiments on bullocks, detailed in the following pages, was to ascertain the comparative value of different foods, such as linseed cake, cotton cake, bean meal, &c., but it was hoped that the results obtained would also supply data by means of which it would be possible to determine approximately the relative value of the constituents of food, such as oil, albuminous compounds, mucilage, starch, digestible fibre, &c., and thus render it practicable to value feeding materials from their composition, as shown by chemical analysis. It was found also, that, with a little extra trouble, the same experiments might be made to show the value of the manure produced by beasts consuming various foods, and thus render it possible to make a complete account of the receipts and expenditure, and so arrive at the financial results of the different modes of feeding.

The bullocks experimented upon were taken from a drove of thirty two-year-old shorthorns, which were bought in October 1872, and were placed on a pasture till the end of November, from which time till January 13th 1873 they were fed in an open yard with bean meal (about 7 lbs. per day), beet (about 1 bushel), and barley straw chaff (as much as they required per day). From these, on January 13th, eighteen were chosen, special attention being paid to regularity of size and fattening quality, and were placed in their boxes without food preparatory to weighing early on January 14th.

The weighing was effected on a weigh-bridge on the premises, each beast being weighed separately and numbered, so that the weight of each before and after the experiment could be ascertained.

At the same time four three-year-old shorthorns, which had been similarly fed for some weeks previously, were weighed, numbered, and placed in the same shed with the eighteen two-year-olds, making the total number of beasts twenty-two. These were divided into six lots, five lots of four beasts each, and one of two, and were placed in a covered shed divided into eleven spaces or boxes, the food and water for each being placed in mangers which separated the boxes from the path running next the wall of the building.

To arrive at the proportion of dead to live weights, an average bullock was chosen from the twelve remaining of the drove. This was weighed alive, killed, and the carcase weighed, and the weight of carcase in the beasts chosen for experiment estimated according to the result obtained.

The foods chosen for experiment and the bullocks were arranged as follows:—

TABLE I.

Lots.	Description of Food.	Bullocks.
1	Linseed cake, beet, and barley chaff	4 two-year-olds
2	Cotton cake (undecorticated), beet, do.	4 two-year-olds
3	Bean meal, beet, do.	4 two-year-olds
4	Bean meal and linseed steamed, with chaff	4 two-year-olds
5	Linseed cake, beet, and barley straw chaff	4 three-year-olds
6	Cotton cake, bean meal, beet, and chaff	2 two-year-olds

The quantity of each food given was such as it was considered would give the best financial result, a gradual increase being made as the feeding proceeded. The weight of beet per head per day was the same for each lot except No. 5, which, being larger beasts, required about one-quarter more than the others.

Barley straw chaff was mixed with the beet and cake or meal, according to the requirement of the lot as indicated by the consumption of the previous day. The food for lot 4 was prepared by boiling bean meal and crushed linseed with a convenient quantity of water, the mixture being poured on barley straw chaff in a vat, well mixed, and stamped down, and left for use the next day.

Water was supplied by tanks in the manger to each beast, so that, except for weighing once every month, they were not disturbed.

All the food and straw for each lot was carefully weighed and noted on a slate by a trustworthy servant frequently under our own inspection, the weights being copied from the slate on to paper by ourselves every three days.

During the second month of the experiments two of the bullocks, one from lot 2, the other from lot 4, showed symptoms of ill-health, and were removed from their lots. The proportion of food consumed by these beasts was estimated at one-quarter the amount, and was deducted from the amount of food consumed by the lots to which they belonged. It may be supposed that this is too much to deduct for the consumption of an unhealthy beast, but as in both instances they had during the first month each increased about 7 lbs. more than the average of their lot, and had been noticed to be greater consumers than the rest, it would appear that this amount was not sufficient, and that the remaining three had been charged with more than they had actually received; but it is also certain that the few days between the commencement of their illness and the day on which they were removed, they did not eat so much as one quarter, and so counterbalanced the excess which they had before consumed. It is to be regretted that it should be necessary to adopt such an uncertain method, for a slight inaccuracy may no doubt have occurred; but the error between the result obtained in this way and the actual fact, when it is remembered that it is the difference in the food of one bullock out of four, for one month of six, will not appear to be of any material importance.

Besides these two losses, two from lot 5 had to be removed, and as in the comparison of the fattening capacity of bullocks of different ages very great accuracy is required, it has been deemed advisable not to include the results obtained from the remaining two of this lot in the report, but only to state briefly that the increase produced per 100 lbs. live weight was much the same as in lot 1.

As before mentioned, the bullocks were weighed at the end of each month, and the weights then obtained agreed with the final result. The average increase of live weight per the total six months, per one month the average of the six, per one week, per first three months, and during the latter three months, is shown in the following table:—

TABLE II.

In this and in the following tables a stone contains 14 *lbs., and except where otherwise stated, the figures following a* (·) *are decimal fractions*:—

No. of Lots.	Name of Food.	Increase of Live Weight per total Six Months.	Increase of Live Weight per Month.	Increase of Live Weight per Week.	Increase of Live Weight per first Three Months.	Increase of Live Weight per second Three Months.
		stones.	stones.	stones.	stones.	stones.
1	Linseed cake, beet, and chaff	25·5	4·25	1·06	13·0	12·5
2	Cotton cake, do. do.	27·2	4·53	1·13	13·7	13·5
3	Bean meal, do. do.	23·7	3·95	·98	11·5	12·2
4	Bean meal, and linseed, do.	17·5	2·91	·72	9·0	8·5
6	Bean meal, cotton cake, beet and chaff	25·0	4·16	1·04	11·5	13·5

From this table it would appear at first sight that bullocks fed on bean meal fattened more quickly in the later stages of feeding than beasts fed on other feeding stuffs, but from the fact that lot 4 was partly fed with bean meal, and increased less during the last three months than in the previous twelve weeks, it would appear that such a conclusion is too uncertain to be relied upon.

Whilst considering this table, it must be borne in mind that from January 14 to May 3, lots 1, 2, 3, and 6 received a gradually increasing quantity of minced beet, but at this date the supply was consumed, and had to be substituted by tares and rye cut into chaff, and although this was given in quantities considered to be equal to the beet, yet a difference may have occurred which might affect the result. But when it is remembered that the amount of cake and meal given during the last was greater than during the first three months, and yet the beasts increased less, it will seem certain that bullocks do not increase so fast in the later stages as in the first few months of feeding.

The beasts from lots 1 and 2 were removed and killed on July 5th, those from lots 3 and 4 on July 12th, and lot 6 on July 19th; thus lots 3 and 4 were kept twenty-five weeks and four days, or one week longer than lots 1 and 2, while lot 6 was fed for twenty-seven weeks and four days, or three weeks longer than lots 1 and 2.

In Table 2 the statements are calculated on the six months, or twenty-four weeks, from January 14th to July 1st 1873, but in Table 3 and the following tables the weights for the whole period are given, as in that way only could the proportion of carcase to live weight be fairly included.

The following table shows the actual weight of the food consumed, and the increase produced, &c., by each lot during the whole period of feeding. The figures given in this and in the following tables are for one bullock:—

TABLE III.

TABLE III.

In this, and in the following statements, Carcase means only the Butcher's Meat, apart from the Hide, Head, Feet, Tail, and other Offal Parts.

Number of Lot.	Linseed Cake.	Cotton Cake.	Bean Meal.	Linseed (Crushed).	Beet (Minced).	Tares and Rye Chaff.	Barley Straw Chaff.	Average Live Weight in January.	Average Weight of Carcase on January 14th.	Proportion of Carcase to Live Weight in January.	Average Live Weight in July.	Average Weight of Carcase in July.	Proportion of Carcase in Live Weight in July.	Increase of Live Weight from January to July.	Increase of Carcase from January to July.	Proportion of Carcase in the Increase in Live Weight.
	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	stns.	stns.	per cent.	stns.	stns.	per cent.	stns.	stns.	per cent.
1	12·5	...	...	...	58·5	31·7	10·5	53·5	26	48·5	79	42·7	54	25·5	16 7	65
2	...	19·7	...	...	58·0	31·7	11·0	55·7	27	48·5	83	44·0	53	27·0	17·0	63
3	...	...	17	...	58·0	34·2	11·5	58·7	28·5	48·5	84	42·7	51	26·0	14·2	55
4	...	...	11·3	5·3	...	...	21·7	54·0	26·2	48·5	72	35·2	49	18·0	9·0	50
6	...	11·5	11·5	...	58·0	37·0	11·0	55 5	27 5	48·5	83	45·0	54	27·5	18·0	65

The proportion of carcase to live weight, shown in this table to be on an average of the five lots about 52 per cent., is lower than is usually found in fat beasts. This is principally due to the bullocks having grown as well as fattened, and so increased in offal parts as well as in flesh, and partly because their food contained more indigestible fibre in the form of chaff than is usual; for, from the fact that the percentage of each corresponded in every case to the quantity of chaff consumed, it appears that the digestive organs of animals increase according to the amount of indigestible fibre that passes through them. It may be suggested that lot 6 is an exception to this rule, for if the amount of chaff consumed by this lot be compared with that given to lot 1, it will be found to be four stones per head more, and yet the percentage of offal parts in lot 6 is less than in lot 1; but this is only apparent, for if the amount of chaff consumed by lot 6 during the three weeks they were kept longer than lot 1 be deducted, it leaves the total about ten cwts., which is less than any other lot.

Leaving the remaining figures in this table to speak for themselves as to the value of the feeding stuffs employed, we will proceed to the more difficult question of the comparative value of the various constituents of food as shown by these experiments. As it was hoped these experiments would serve to indicate which of the two principal classes of the constituents of food—the nitrogenous or the carbonaceous—ought graziers to endeavour to obtain the most of when purchasing cattle food, careful analyses were made of each food given during these experiments. The following table shows in the first three columns the weight of the nitrogenous, fatty, and other carbonaceous matter supplied per head by the food :—

TABLE IV.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
Number of Lot.	Nitrogenous Compounds consumed.	Oil and Fatty Matters consumed.	Other Carbonaceous Matters (Starch, Digestible Fibre, &c.) consumed.	Total Carbonaceous Matters (column 2 being multiplied by 2·5, and added to column 3).	Meat produced.	Pounds of Meat produced per 100 lbs. of Nitrogenous Matters.	Pounds of Meat produced per 100 lbs. of Carbonaceous Matter.	The Average of column 6 being reckoned as 100, and each amount calculated accordingly.	The Average of column 7 being reckoned as 100, and each amount calculated accordingly.
	stones.	stones.	stones.	stones.	stones.	lbs.	lbs.		
1	43	12	137	167	16·7	38	10	122	113
2	58	6·5	146	161	17·0	30	10·5	96	119
3	46	...	172	172	14·2	31	8·2	100	93
4	34	14	112	147	9·0	27	6·1	87	69
6	62	4	183	193	18·0	29	9·3	93	105

To make this statement more simple, the amount of fatty matter (column 2) is multiplied by 2·5, and added to the other carbonaceous compounds (columns 3 and 4), as it is generally admitted that oil, &c., is worth two and a half times its weight of starch, cellulose, &c., as a fat-producing substance.

It will be observed that lot 1 received 167 stones of total carbonaceous matters, and produced 16·7 stones of meat, while lot 2 consumed 161 stones, or 6 stones less of the fat-producing substances than lot 1, and yet produced 17 stones of meat, or ·3 stones more. This result is explained by the greater amount of the nitrogenous matters supplied to lot 2 than to lot 1, as shown in column 1 (Table IV.)

Lot 6 consumed 193 stones of total carbonaceous matter, or 32 stones (=⅙th) more than lot 2; therefore the increase of meat by this lot, if it depended on the weight of these substances supplied, ought to be ⅙th, or 3 stones more than the produce of lot 2, but it is only 1 stone. This is also accounted for by the amount of nitrogenous matters consumed by lot 6 being only 4 stones more than that eaten by lot 2.

To show the proportion of increase to the nitrogenous and carbonaceous matters more clearly, the lbs. produced per 100 lbs. of these two classes of constituents of the food are shown in columns 6 and 7; and for the sake of greater simplicity the average of these columns is reckoned as 100, and the separate items calculated accordingly, as shown in columns 8 and 9 (Table IV.) From these it appears that the rate of increase in these experiments depended more on the amount of nitrogenous matters than on the carbonaceous compounds consumed.

But it is only reasonable to suppose that there is a limit to the amount of nitrogenous matters which can be given with advantage to fattening animals, without rendering it necessary that the supply of carbonaceous substances should be increased.

The following Table (V.) shows the proportion which the carbonaceous compounds bear to the nitrogenous matters in the food given to each lot in these experiments, and also, for the sake of comparison, in various natural productions which are recognised as very suitable food for stock:—

TABLE V.

Name of Food.	Proportion of the Fat-equivalent of the Carbonaceous Compounds to the Nitrogenous Matters (the latter being reckoned as 1).
Food given to Lot 1 in these experiments, .	1·5
„ „ 2 „ „ .	1·1
„ „ 3 „ „ .	1·4
„ „ 4 „ „ .	1·7
„ „ 6 „ „ .	1·2
In Milk from a Cow, ...	1·7
In Grass (mean of Grasses), ...	1·8
In Turnips, ...	1·4

This statement shows that the food given to lots 2 and 6, which gave the greatest increase, contained the highest proportion of nitrogenous matters, from which it would appear that flesh-forming substances may be advantageously given in a greater ratio to the fat-producing matters than that in which they exist in milk, turnips, or grass.

Having then decided that, *ceteris paribus*, a grazier ought to endeavour to purchase in the food he gives his cattle the greatest amount, within the limits indicated in Table V., of flesh-forming substances, we will endeavour to arrive at the cost at which they can be obtained.

Decorticated cotton cake is perhaps the cheapest source of nitrogenous matters. This can be bought for about L.8, 10s. per ton, and should contain at least 40 per cent. of these substances, which, therefore, without deducting anything for oil and other carbonaceous compounds, cost 4s. 3d. per unit per cent. per ton. If a similar method of valuation be applied to oil, it will be found that it cannot be obtained as such for less than 8s. 6d. per unit per cent., or just double the cost of flesh-forming matters. But it must be remembered that the theoretic equivalent of oil as starch can be obtained in the form of maize, barley, &c., at a much less cost than as oil or fatty matters. Indian corn contains about 75 per cent. of total carbonaceous matters, which, divided by 2·5, to reduce it to the weight of fat to which it is supposed to be equal, gives 30 per cent., which at L.8 per ton is equal to 5s. 4d. per unit per cent., or 3s. 2d. per unit per cent. cheaper than oil from any source. But even at this reduced price, fatty matters, or their equivalent, cost more, weight for weight, than nitrogenous matters, and, if these experiments are reliable, are already in excess of the actual amount required in most mixtures on which cattle are fed.

After the termination of the experiments, the manure made by each lot was removed and weighed separately on the weighbridge, a portion for analysis being taken from all parts at various depths from each box, and the bulk valued according to the amount of ammonia and phosphate of lime it was found to contain.

This system was adopted in preference to the more common practice of estimating the value of the manure from the analysis of the food consumed in its production, because of the following reasons:—In this way it was possible to arrive at its actual commercial value, by comparing its composition and price with that of manure bought from towns; for it is absurd to say manure is worth *m* shillings because it contains *n* lbs. of ammonia, which cannot be bought in the form of artificial manures at less than *m* shillings, while muck from the nearest town, and of the same composition, can be purchased at a smaller cost.

In valuing manure according to the composition of the food it is assumed that the whole, or nearly so, of the nitrogen remains in the muck, while it is well known that nearly half is lost before it reaches the land. This is shown by the results obtained in these experiments:—

TABLE VI.

	Number of Lot.				
	1.	2.	3.	4.	6.
	lbs.	lbs.	lbs.	lbs.	lbs
Ammonia contained in Food and Straw,	119	161	126	91	170
„ „ Manure left, .	64	72	70	58	88
Loss by evaporation, &c, . . .	55	89	56	33	82

The following Table (VII.) shows the weight of the straw consumed and manure produced by each lot, and also the amount of ammonia and phosphate of lime which the latter contained:—

TABLE VII.

Number of Lot.	Name of Food.	Straw used for Litter.	Manure produced.		Ammonia it contained.	Phosphate of Lime it contained.	Value of Ammonia at 6¼d. per lb.			Value of Phosphate of Lime at 1¼d. per lb.			Total Value of Manure.		
		cwt.	tons.	cwt.	lbs.	lbs.	£	s.	d.	£	s.	d.	£	s.	d.
1	Linseed Cake, &c.,	16¼	4	4½	64	104	1	13	4	0	10	10	2	4	2
2	Cotton Cake, &c.,	16	5	5¼	72	115	1	17	6	0	11	11	2	9	5
3	Bean Meal, &c., .	17	4	14¼	70	114	1	16	5	0	11	10	2	8	3
4	Linseed, Bean Meal, &c., . .	13	4	1¼	58	100	1	10	2	0	10	5	2	0	7
6	Cotton Cake, Bean Meal, &c., . .	18	6	2	88	154	2	5	10	0	16	0	3	1	10

The price per lb. of ammonia and phosphate of lime, according to which the manure was valued, was arrived at by the following calculation:—

The average percentage analyses of the manure made by lots 1, 2, 3, 4, and 6, was—ammonia ·65, and phosphate of lime 1·1 per cent., which is about the same composition as an average sample of town manure, which, when delivered on the farm at which these experiments were made, would cost about 10s. per ton.

Ammonia in the form of artificial manures costs 10d. per lb., and phosphate of lime about 2d. per lb. According to these data, one ton of an average sample of the manure made by lots 1, 2, 3, 4, and 6, would be worth 16s. 2d.; but as it can only be valued at 10s., ammonia, as supplied by farm-yard manure, is worth in this neighbourhood about 6¼d. per lb., and phosphate of lime, under these circumstances, 1¼d. per lb.

In Table VIII. is given the weight and cost of all the food, straw, &c., used, and the value of the meat and manure produced by each lot.

In this statement the increase of meat is valued at 10s. 6d. per stone, the price at which it was sold.

The value given for the foods, straw, &c., is fixed according to the amount they could have been sold for at the time in the neighbourhood in which the experiments were conducted.

TABLE VIII.

The Financial Result of each Experiment.

No. of Lot.	Linseed Cake (valued at £12 per ton).	Cotton Cake (at £6 per ton).	Bean Meal (at £9, 10s. per ton).	Linseed (at £18 per ton).	Beet (at 10s. per ton).	Tares and Rye (at 8s. per ton).	Cut Straw Chaff (at 35s. per ton).	Straw for Litter (at 30s per ton).	Coal for Lot 4 (at 28s. per ton).	Value of Meat produced (at 10s. 6d. per stone).			Value of Manure remaining (see p. 319).			Value of Meat and Manure.			Total cost of Food, Straw, Coal, Labou, &c.			Profit on each Lot.			Loss by each Lot.		
	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
1	12½				58½	31¾	10½	16¼		8	14	0	2	4	2	10	18	2	12	14	6				1	16	4
2		19¾			58	31¾	11	16		8	18	6	2	9	5	11	7	11	11	3	3½	0	4	7½			
3			17		58	34¼	11½	17		7	10	0	2	8	3	9	18	3	13	10	7				3	12	4
4			11⅛	5⅛			21¾	13	9⅓	4	14	6	2	0	7	6	15	1	15	4	2½				8	9	1½
6			11½		58	37	11	18		9	9	9	3	1	10	12	11	7	14	8	2				1	16	7

It will be observed that, after deducting the expenses from the receipts, in only one instance is a balance left. This may be partly due to the beasts employed being what is called "a bad doing lot," but it seems to be questionable whether grazing under these circumstances is, after all, such a very profitable investment for capital.

Before concluding this report it may be well to point out a few possible sources of error in the above experiments.

The most probable of these would be the necessity of calculating the results of Lots 2 and 4 on three beasts, owing to the loss of the fourth during the experiments, and Lot 6 having from the commencement consisted of two bullocks, thereby rendering it possible that the result, being calculated on so few animals, might be seriously affected by the difference in fattening capacity of either. But as the maximum difference between the increase of any one beast and that of the average of the lot to which it belonged is only two stones, it would appear that no great error need be feared from this source. For, supposing it to be possible that such a large difference could exist in the quality of the bullocks, its money value would be only L.1, 1s., which can be added to, and deducted from, the result obtained from any one lot without materially affecting the practical result.

The composition of the food given to each lot, as shown in this report, may vary slightly from the actual truth, as samples for analysis were only taken at intervals during the experiments, and not from each day's supply. Also, a slight error may have been made in the analysis of the samples of the manure from each lot, and consequently in the value set upon it, for it is very difficult to prepare a fair sample from so large a bulk as four to five tons.

If the increase produced by Lots 1 and 3 be compared with the composition of the food they consumed, it will be seen that although the beasts fed on bean-meal were supplied with more of both the nitrogenous and carbonaceous constituents of food, yet their increase is less than that of Lot 1.

This, at first sight, would appear to show the greater value as food of the oil contained in the linseed cake, over its equivalent of other carbonaceous matters supplied by bean-meal. But after a careful examination of the increase produced by each beast in Lot 3, it appears that No. 1 increased 2 stones (dead weight) less than the average of the lot; but if this bullock be excluded, and the result calculated on the remaining three, it gives 15 st. 7 lb. as the increase per head, which is 1 st. less than the average produce of Lot 1, and so will not account for the difference in the increase of these lots, both having been fed on food supplying about the same amount of real food.

It is possible that this result may have been produced by the variation in fattening quality of the bullocks experimented upon, but we are inclined to attribute it rather to the less easily assimilable nature of the constituents of food as supplied by bean-meal than when presented in the form of linseed cake, and are confirmed in this view by finding that Professor Anderson many years before suggested that such a difference probably existed in the quality of various feeding stuffs.

In conclusion, it must be remembered that the results obtained in the feeding of the bullocks in these experiments must not be taken, without further proof, as an indication of what may be expected from beasts fed under totally different circumstances. For instance, these experiments were conducted in a warm covered shed, during the latter part of a mild winter and spring and summer of about average temperature. Had the bullocks been exposed to a severe winter in a cold open yard, it is probable that a greater consumption of carbonaceous matters would have taken place in their lungs in order to keep the blood at an even temperature, thereby leaving a smaller quantity to be stored as fat, and so make the proportion of albuminous compounds more instead of less than was required.

ON THE EFFECTS OF WET AS COMPARED WITH DRY SEASONS ON WOODS, FORESTS, MOORS, GAME, &c.

By Christopher Y. Michie, Forester, Cullen House, Cullen.

[*Premium—Five Sovereigns.*]

Much has been written on the effects of remarkable seasons upon the various crops which the soil produces, embracing forest trees, shrubs, grass, cereal and green crops, together with their direct and indirect influences upon the human family and lower animals.

For some unaccountable reason, the effect of seasons remarkable for their heat and dryness have been lavishly dwelt upon and kept in remembrance, while wet, cold, and sunless seasons have passed and gone without exciting note or comment, though the evils resulting to the country from the latter are manifold greater than from the former.

In Scotland, the evils arising from heat and drought are comparatively small when weighed against those resulting from cold and wet.

In 1868, elaborate articles were written and circulated in the public newspapers and otherwise, with a view of showing the close and inseparable connection between forests and moisture, or rather trees and rain. One zealous writer continued urging the necessity of forest tree planting, with a view to produce or increase rainfall, till such superabundance came as for the time extinguished his zeal; but no sooner did 1869 begin to show corresponding signs of drought with those of the previous year, than he again commenced to call aloud for planting, and denounced the cutting down or clearing of plantations, woods, forests, and even single trees, as the most certain and effective means possible for executing the ruin of the country. The autumn of 1869, however, eventually turned out cold and wet, so that rain was for the time complained of instead of wished for, and the clamour for planting as a means of producing rain ceased.

A statement of carefully collected facts on the wet season of 1872 may, it is presumed, prove a fitting accompaniment to those on the dry season 1868. While a well-grounded knowledge of the facts resulting from the dryness of some seasons and wetness of others may constitute an interesting and instructive subject of contemplation, it is not likely that such knowledge, however perfect, would ever furnish man with sufficient power to modify or regulate, much less create or produce, such changes in the elements as to prove of real practical benefit to the country. But because we cannot accomplish everything, that is no good reason why we should attempt nothing; and while there are things over which we have no control, there are others over which we have power all but absolute.

If the planting of hill-tops with trees, and covering the mountain side with forest, may attract the vapoury cloud or condense the floating mist, man may accomplish much, and rejoice, if he will, in the works of his hand.

But assuming that cause and effect were a known and established law between trees and rain, it might well be asked, would it be for the general welfare of the nation to increase trees that more rain might fall? Would it be advantageous to the interests of the country to extend the area of its woodlands in the face of outstanding and indisputable facts, showing that the excess of rain, cold, and damp, do infinitely more injury not only to all kinds of vegetation, but to all classes of animals, including man, than drought and heat have ever done, or are likely to do, in this country? The highest successfully-cultivated land in Inverness-shire, or perhaps in Scotland, is on the farm of Lethandry, parish of Duthil, Strathspey, situated on the south-east side of the hill, with higher ground and woodland behind it on the north side. The land referred to is between 1200 and 1500 feet above sea-level. In hot and dry seasons, the grain crop ripens as well and almost as early as at altitudes one half lower; but in wet and cold seasons, it seldom ripens at all. In 1868 the cereals on this farm were a splendid crop, while in 1872 scarcely as much grain was reaped as was sown upon it. The early part of both seasons, 1868 and 1872, resembled each other so closely, that plants of whatever kind that start early in growth and mature their wood early made growth in both seasons nearly alike. The Scots fir, being if not the first tree to swell its bud and start into growth, is at least the first forest tree to mature its young wood, and therefore suffers less from excessive wet or dry seasons than any others do. On cutting up or dissecting Scots firs of any age from the sapling to the tree a hundred years old, it is found that the concentric rings or layers of wood are about the same in all seasons, whether hot, cold, dry, or wet,—at least, the difference is so small that the connection cannot well be traced; and situation, exposure, soil, &c., may produce the difference of growth altogether independent of atmospheric influences, or at least produce such important results as to obliterate the otherwise traceable effects of favourable or unfavourable seasons, excessively dry or wet. We have known, and can point out, trees of almost every age and species which, in consequence alone of their roots entering better and more congenial soil after remaining long in soil unsuitable to their nature, burst forth with magical vigour, and assume altogether a new and improved habit of growth. Other trees are known to have fallen into a sickly state and become stunted in growth from such causes as their sheltering neighbours being removed.

Drainage has materially altered and improved both single trees and large areas of plantation or forest, while the obstruction of drains and water-runs has universally injured or ruined all forest products with their influence. Let the above examples suffice, though hundreds might be given to show the way and manner by which false conclusions are arrived at in regard to the growth of trees, as indicated by the annual layers or concentric rings.

In 1862 the writer had to do with a quantity of natural Scots fir trees in Strathspey blown down. The trees were cut off root with the saw, by which means the zones or layers of wood were distinctly seen, so as to be examined minutely. The writer, with the view of ascertaining the various ages of the trees, was in the practice of counting the zones or rings, when by mere chance he found that forty-five years before that time the growth of 1817 was only about $\frac{1}{16}$th of an inch thick, while the growth of the year before and after it was from $\frac{1}{10}$th to $\frac{1}{4}$th thick. This unusually small growth situated between two large ones, and being found not upon a few trees only, but upon all within an area of nearly a mile, suggested an investigation as to the cause of it, but all efforts to find it out proved fruitless. In this case we can only give as conjecture, that as the small growth was so universal, the cause must have been an atmospherical one, probably frost. While the growth of advanced and old Scots fir trees in 1872 was an average one, at least upon dry soils and southern exposures, it was otherwise with newly-planted trees and very young ones, especially in the nursery ground. Few, if any, of even the least favoured plants perished in consequence of the wet and cold, but as the season advanced they turned white in the leaves, assumed a pale and sickly appearance, and made almost no perceptible top growth.

Nurserymen in many cases, both north and south, lost heavily by their seedlings one and two year old transplanted, it being no uncommon thing for them to sell the plants at three years old at the same price as they paid for the seedlings two years old. In some transactions in which the writer acted, the same money was paid for the plants at three years old as was paid for the same plants the year previous when only two years old, thus showing that the nurseryman lost one whole year's growth upon the plants, and his labour besides. The loss of one year's growth upon the plants was, however, neither the greatest loss nor the only one; for the young plants having so imperfectly ripened their terminal shoots as to cause them either partially to wither or lose the top bud, must injuriously affect the whole structure of the plant for many years hereafter. Fortunately for the imperfectly ripened wood and semi-developed buds, the succeeding winter was unusually mild and open, and the spring and summer months favourable; otherwise the injurious effects on nursery plants would have been still more serious than they were.

Having closely observed the results of the two seasons, 1868 and 1872, in producing fruit in the Scots fir, we find that the former produced it much more abundantly than the latter, bearing in mind, as we do, that the perfect cone of the Scots fir is the product of two years,—that is, it blooms in May, and remains on the tree enlarging to the size of a filbert the first year. The second it undergoes no further change beyond simply enlarging and maturing its seed, which is ripe in November. If May is a cold, frosty month, the fruit-blossom is blasted and rendered useless. If the autumn months are wet and cold, the seed in the cone does not mature, and this was the chief source of complaint in 1872. The former part of the season 1868 was extremely dry, so much so that many trees and shrubs upon a southern exposure, upon a dry, gravelly soil, shed their leaves by midsummer. Towards the end of August copious showers fell, and as the season advanced the ground became well watered, and the buds of trees and shrubs swelled beyond their usual size and proportions.

The spring of 1869 displayed an unprecedented profusion of blossom, and in due time a superabundant crop of almost all kinds of fruit. The branches of beech, oak, chestnut, hawthorn, &c., literally broke off, as unable to sustain their weight.

Larch.—Up to the middle or end of August 1872, nothing adverse was apprehended as to the growth of the larch; indeed, our own opinion was that it looked very well, and indicated a good season's growth, having in view some larch plantations on rather thin, dry soil. As it is in August and October, however, that it makes its principal top growth, and as this period proved very unfavourable for its growth, the results in that respect were very unsatisfactory upon the average of soils and situations.

Probably no better lesson of instruction upon the culture and growth of larch could be given than the results of 1872. It indicated in a very clear manner the conditions as to wetness or dryness of soil under which it thrives or degenerates.

Upon clay soils imperfectly drained the growth was of the lowest possible order, and to many trees another similar wet season would prove quite fatal.

Upon different qualities of loam the difference of growth was very distinct. The darkest and richest soils and stiff wet clays produced the worst growths; and the light coloured and sandy or gravelly soils, where the subsoil was open, perhaps the best. A very remarkable example of this was to be seen in a plantation sixteen years old, under the writer's charge. A large area of the plantation is literally covered with whins, so close that neither heath nor herbage of any kind can grow amongst them. To encourage the growth of the trees, the whins had been cut several times from the period of planting. The ground being poor and naturally barren, the trees grew slow upon it, and the whins, already established and deeply rooted, soon gained supremacy over them. Every returning season the trees renewed their feeble efforts of growth, and just as regularly, but more rapidly, the whins grew and overtopped them. The average annual growth of the trees was about six inches, counting ten years back, and the growth of 1868 about three inches.

On going carefully over the plantation and measuring the top shoots, we found that the growths of 1872 against the three preceding years' average were as twelve to four inches. Some trees, indeed, that had made only seven or eight inches the year before had in 1872 made sixteen and eighteen inches of top growth. The newly-formed shoots were not only tall, but strong, proportional, and vigorous. As a rule, larch grown amongst whins usually assumes a black, unhealthy appearance, caused no doubt by the latter absorbing the moisture and nourishment of the former. In 1872 this appearance, so far as affected the shoots of that year, was completely changed, and instead of a dark smutty colour, a beautiful bright straw colour was produced, which imparted to many of the trees a peculiar appearance, the young shoots being very light, and the older wood and bark very dark. To many the black and sooty appearance of the larch referred to appears as confirmed disease, whereas, as revealed in the growth above described, it is manifestly only the want of nourishment and moisture in the soil; and whenever a season occurs supplying these, the appearance of disease is gone, at least for the time. Though the larch amongst the whins made a vigorous growth, it did not advance much upon the whins; for unfortunately the circumstances which favoured the growth of the one equally favoured the growth of the other, as will subsequently be seen.

The growth of the larch, like that of other trees, is erroneously estimated by the length of the top shoots, as some seasons are most favourable to top growth, and others to stem or lateral growth. On dissecting and examining the structure of trees, this is clearly exhibited. For example, the annual layer or zone of 1868 was fully as thick in many cases as usual, while the top growth of the same trees was not quite one-third its usual length. The growth, too, of one season greatly influences that of the next. One season, as it were, lays by in store what is next year to be used in growth. The growth of 1869 was a clear example of this in contrast with 1873, the former being far above an average, while the latter is below it. A dry season, therefore, apparently husbands strength in the tree, while a wet season evidently exhausts its strength. Next to the loss of growth (as such) was that sustained by the terminal shoots not maturing and ripening. This, however, need not surprise when we bear in mind the long continuation of dull, wet weather, and all but entire absence of sunshine during the autumn months. Serious fears were entertained for the safety of the top shoots, and such fears were unhappily too well grounded, for in all low-lying situations, and in some high northern exposures, the injury to the top shoots was a very serious matter, necessitating the operation of pruning to give a single leader to the tree. The younger the trees, generally speaking, the more liable were they to damage in the top, but few trees over twenty feet high suffered to any extent.

The last evil and loss we have to record is that of the fruit or seed. So far as affects the growth of the tree itself, the less seed the better; but as it constitutes a very important article of rural produce, and basis of the nursery operations of tree culture, its loss as a crop is too great to be omitted. Many nurserymen propagate their larch seedlings exclusively from home-grown seed, and the scarcity caused by the failure in 1872 caused it to rise in price from 85s. to 150s. per cwt. In addition to the scarcity, the seed was also of very inferior quality, being small and unsound; and instead of producing 1,500,000 plants per hundred weight, yielded only about 800,000 plants of an inferior class. Some forms of disease to which larch is liable were provoked by the excessive wet, while others (if disease it may be called) were remedied. Trees suffering from wet were damaged, those from dryness and want of nourishment benefited.

Spruce.—The Norway spruce not being planted in this country to anything like the extent of larch or Scots fir, the results, whether adverse or favourable, could not be of such magnitude or importance as with them. The spruce, though usually planted in soft, marshy, and wet ground, delights more in rich, dry loam, and a dry, but not exposed, situation. In cold, wet years, as 1872, it grows less than in warm, dry seasons, as 1868; for though its succulent roots absorb much moisture, it grows best where its roots are dry. It appears that cold rather than wet is what the spruce dislikes.

Silver Fir.—The silver fir when young is very delicate, tender, and sensitive of frost, and seldom escapes many seasons together without sustaining injury from it. When well advanced in size, however, and when planted at high altitudes, it receives little or no injury.

In a plantation in Banffshire under the writer's care, Scots fir and larch were originally planted upon rotten quartz rock full of water. About twenty years ago the Scots fir and larch had begun to decay, and fears were entertained that the whole plantation would become a complete failure. The forester in charge of the plantation at the time, by way probably of experiment, continued filling in all the vacancies as they occurred with silver fir; and, to his credit, the whole have so admirably succeeded that it is now one of the finest thriving silver fir plantations on the estate. The situation is about 700 to 800 feet above the sea-level, and severely exposed to the north, to which it slopes. It is distant from the sea seven miles. The presence of rock near the surface prevented the possibility of drainage; and the coldness and wetness doubtless caused the Scots fir and larch to decay. The silver fir is now overtopping the remaining original crop, and growing rapidly upon the identical site where the other trees died, thus proving beyond dispute that the silver fir is the hardiest of forest evergreens, and moreover grows well in soil too cold and wet for other species. On examining and comparing the top growths of the silver fir in this plantation with that of other trees in the same plantation, it is found that the growths of 1873 are fully twice the length of any others, and fully as long as in previous years. The growth of 1868, however, was considerably less.

Beech.—The beech, though a hardy tree, does not well sustain either extremes of dryness or wetness, but prefers dry to wet soils. In 1868 many trees completely lost their foliage at midsummer, and became naked as at midwinter; but no sooner did the rain moisten the ground in August than the buds immediately began to swell, and some of the trees that lost their foliage earliest became verdant and green. A very decided contrast of growth was manifested between that of 1868 and 1872 upon beech hedges. Those that stood upon very dry situations, such as turf dykes, sandy banks, and dry hillocks, made remarkably fine growths in 1872, while in 1868 the order of growth was in the inverse way. Most newly-planted beech hedges grew well in 1872, and some older hedges, that made little progress since planted, put forth healthy and vigorous shoots. There is seldom a good crop of beech mast unless the autumn of the preceding season is a favourable one. Upon this, more than any other circumstance, depends the crop of beech-nuts.

Elm.—Whether the wych elm from being, as is generally affirmed, a native of Britain, is more hardy on that account, and better adapted to the vicissitudes of weather than most other forest trees, is difficult to determine. But it is evident that the elm little regards climate, wind, storm, or tempest, provided only its roots are in congenial soil, and liberty given it to expand its branches. As the elm luxuriates and attains perfection only in rich dry loam, the comparative abundant crop of fruit upon it (after a season of wet) may perhaps be accounted for as follows:—A superabundant crop of fruit in any tree is regarded as an indication of weakness, degeneracy, or disease, but the superabundance of moisture which constituted the producing cause of the large crop may, perhaps, be correctly regarded as much an essential element in the economy of the tree's growth as the soil in which it grows or the air that surrounds it. As the result of a very wet season, there was a disproportionately large crop of fruit as compared with others, yet nothing is manifested to show that the trees are more injured by much rain and much seed than by dryness and little seed. The more rain and moisture trees growing in certain dry situations secure (to a limited extent), the more fruit they are induced to yield without injury or hurt. But whether the trees suffered or benefitted by seeding, whether the want of moisture usually prevents the elm from seeding abundantly, or whether the wych elm as a forest tree in reality yields more seed after a wet than after a dry season in certain situations, are questions we prefer to leave for future consideration; but this we are prepared to substantiate, that the wych elm in 1873 yielded proportionally more seed than any forest tree known to the writer.

The autumn beauties of the landscape of a wet season soon dawn and soon set. No sooner does the foliage assume its autumnal tinge than it drops to the ground on the first shower of rain. On the contrary, the foliage of a dry season assumes if anything a deeper and richer hue and reflects a grander lustre.

It remains longer upon the tree, each leaf tenaciously adhering to its parent branch, and the bud meanwhile, which the leaf nourishes and protects, receives its due meed of benefit, for which it returns thanks in the better display of foliage the succeeding spring. The landscape in a dry district is always richer and more protracted than in a wet one. In Morayshire and Inverness-shire the landscape is better than in Banffshire and Aberdeenshire. The landscape on the banks of the Spey and Ness usually far surpasses that of the Tweed or Teviot.

Ash.—The ash tree, like the wych elm, is believed to be a native of Britain. It is the latest of all forest trees in coming into leaf, and the first in the forest to shed it, by which provision it escapes late spring frosts and avoids early autumn ones. It is often the middle of June before the ash is in leaf, and with the first breath of frost its foliage falls, often as early as the end of September. There are some features in connection with the foliation of the ash and oak specially worthy of remark. If the temperature is above the average height at time of foliation, the ash is the first to expand its leaves, and it is therefore an early season of foliation; but if, on the other hand, the temperature is an average or below it, the ash does not move till after the oak is in full leaf, in which case the season is a late one. The future state of the weather, and the foliation of either tree, has, of course, nothing in connection, as is superstitiously believed by some unacquainted with the subject. The ash this season (in some cases) bore a considerable portion of fruit, but many trees that usually bore an abundant crop bore none. The foliage of the ash in 1872 was thin, poor, and deficient, being fully one-third less in bulk or weight as compared with ordinary seasons. This fact we know from having annually to cart off the leaves in certain parts of the policies under our care; and though the leaves are not weighed, the number of loads are counted each season.

Oak.—The British oak is believed also to be indigenous to this country, and from its tenaceous habits of growth this belief is strongly confirmed. Some oak trees are healthy, though making only $\frac{1}{20}$th of an inch of annual growth in thickness of layer or zone, while usually, when upon good soil, it makes from $\frac{1}{8}$th to $\frac{1}{6}$th of an inch. The wet season of 1872 acted upon the oak just in accordance with the nature of the soil, dry or wet, upon which it grows. On dry, sandy, or gravelly hillocks the growth was over an average, but on clay and heavy loam the growth was considerably below it. These statements apply to trees not exceeding ten years planted. Older trees are not so uniformly affected. Of all deciduous forest trees the oak endures wet and cold best, but is most grateful for a dry situation and strong deep soil.

Alder.—A very common but erroneous opinion is entertained regarding the alder, believing and acting towards it as many do as if it grows only (or best) in wet places, and luxuriates only in bog and swamp. This is altogether a wrong impression, as no tree grows better and is more grateful for a good soil and dry situation than the alder. The dry season of 1868 was of advantage to the alder, and its fruit in 1869 were nearly as large as small larch cones. The leaves also the same season were very large and fleshy, and the growth of the trees good. The whole order of growth in 1872 was the reverse of 1868,—fruit small and deficient, leaves few and of poor texture, and the growth of the trees sluggish and imperfect. On examining the woody structure of alder trees found in peat moss, that have lain imbedded in it for centuries, it is observable that the annual rings or growths have not in any way exceeded or differed from what they are in growing trees at the present day, thus showing, as far as the proof goes, that the climate and other influences usually affecting the growth of trees differed then but little from now. The presumption, however, is, that if the ground had in days of old been drier, the growth of alder would have been better.

Hazel.—The hazel, though by no means a very important plant, yet merits a passing notice. There are many varieties of the hazel, distinguished chiefly by the size, shape, and quality of the nuts. Some sorts of hazel are grown exclusively for the sake of their fruit, while others are grown only for the wood, which is useful for many purposes, as crates, hoops, hurdles, walking staffs, &c. It is usually found growing wild in ravines and rugged precipices, upon land after its own name. In 1868 in many places it made very little growth, even in the form of coppice, and yielded but a small crop of fruit, which, however, was compensated for the ensuing season by a most abundant one. The fruit crop of the hazel, however, is very much influenced by the state of the weather in spring, when its fruit blossom appears about February and March. If frosts occur at that period, the blossom is frequently destroyed, as it appears upon the plant before the leaves expand to cover it.

Whins.—Of all forest productions the whin flourished best in 1872, especially in the form of whin hedges. The growth upon most of the whin hedges under the writer's care was most luxuriant, while upon single whin bushes and groups in many places it was not over an average. While thorn, beech, privet, holly, and yew hedges ceased to grow early in autumn, the whin prolonged its growth till winter set in. The whin hedges on Cullen House estate are let annually by contract to cut, but season's growth 1873 the contractor could not complete for less than 25 per cent. additional, which was paid him in consequence of the extra heavy growth, the result of the former year's luxuriance. The whin, which usually blooms very profusely, was in the spring of 1873 considerably deficient, showing that though the growth was luxuriant beyond common, the bloom was in the inverse proportion.

Ivy.—The growth of ivy in 1872 was the reverse of that of the whin the same season. The growth of the whin being of the strongest and most luxuriant description ever seen by the writer, the growth of the ivy was the weakest and poorest he ever beheld. At Cullen House in Banffshire there are several miles of walls and dykes, splendidly mantled and covered with ivy, which is clipped and trimmed over every season between the beginning of April and end of May. The pruning of the ivy is done by the hedgers, and the prunings wheeled or carted away as the case requires. The hedgers remarked respecting the ivy leaves or prunings, that there was not over one load to three to cart away, knowing as they do the time and labour each wall requires, and the quantity of prunings. The growth on the north side of the wall was much less than on the south side. On examining some of the most exposed walls before beginning to prune them, we noticed many of the leaves reduced to mere skeletons, the whole fleshy part dissolved away, and the stronger fibre only left, somewhat resembling a spider's web or fine network. It is the opinion of many persons that ivy keeps the walls of houses wet and damp. The writer's experience of ivy-covered walls is in the reverse. Our own dwelling-house, and that of many of our neighbours, are completely covered (except the roof) with ivy, and the walls of all of them are drier than those without ivy. Of all plants for absorbing moisture the ivy is perhaps the best, and, therefore, if wet or damp exists about the foundation of the house, ivy will either completely absorb and dry it, or at least render it less wet than it would otherwise be without it. It tends very greatly to strengthen the lime mortar in walls, and will keep up old and rickety buildings long after they would otherwise fall to the ground. Nothing that we know is better for preventing severely exposed gables from admitting rains than ivy; indeed, it is a specific we are annually administering for the above complaint.

Buds.—Abortive buds, the result of the wet season of 1872, is one of great moment, and attended with very serious consequences. It is difficult to say with certainty what species of trees or shrubs suffered most in this respect, or whether the forest, the orchard, or garden was most seriously injured. The buds, being imperfectly matured in the autum of 1872, were soft and unable to resist the amount of rainfall during the ensuing winter, hence the little vitality in them originally was literally bleached out. To some an abortive bud may appear a small and insignificant thing, too trivial to mention. When it is borne in mind, however, that each bud is the representative or parent of a stem, leaf, branch, or fruit, and each failure multiplied by hundreds, thousands, or millions, it must appear clear that the loss in the aggregate to the country, whether in woody fibre, foliage, or fruit, must be very serious and great. The loss of certain buds entails a corresponding loss of certain branches. The loss of others are the occasion of disfigured or ruined stems, from which trees seldom permanently recover. As respects fruit, though the forest suffered much, yet the greater injury was experienced in the garden and orchard. The trees blossomed profusely, and to the casual observer indicated an abundance of fruit. A few weeks, however, soon revealed the true state of matters, as tree by tree dropped its untimely fruit blossom. The secret lay in this, the fruit buds were too weak to develop themselves properly, and instead of the fruit forming and developing itself in the usual natural way, it showed the common unmistakable signs of weakness and imperfection by falling off. This was with apple-trees *chiefly* the result; but it also applied to stone and other fruit in general. All this was, we apprehend, the certain result of the wet and cold season of 1872.

Another circumstance worthy of notice occurred in connection with the buds, namely, the unusual attack upon them by bullfinches. Whether from want of food in the seeds, wherein the bullfinch usually found it, or from other causes unknown, such were the results that no sooner did the buds of the gooseberry, currant, and other fruits begin to expand and open than they were seized upon, and the bushes literally cleared of all the buds in a very short time. In our own garden, and others surrounding, fully three-fourths of the black and red currant crop were destroyed, as also a large percentage of gooseberries. The probable cause of this unusual occurrence of seizure by bullfinches of the buds may probably be found in the birds being disappointed at not finding their usual natural food in thistle and other seeds, by instinct were led to seek it in buds of bushes. It is pretty generally known that all along the sea-coast, and ten miles or so inland, severe destruction from frost winds is seldom experienced. The winter of 1872 was unusually mild all along the northern coast. The greatest number of degrees of frost at Cullen House in Banffshire was 23 degrees on the 24th of February.

To many the mention of heather as affecting the interests of the country may elicit a smile, it being in many respects one of the lowest of vegetable products. It can, however, be shown that much revenue is either directly or indirectly derived from the heath-clad mountain ranges of the country, not so much as a feeding or grazing product for sheep or cattle, neither as the best of honey-producing plants, but for producing and maintaining our principal winged game, "the grouse." The grouse, in point of fact, feeds chiefly, and all but exclusively, upon the young tender top shoots of common heath (*Erica vulgaris*), and, best of all, upon young heath, the third or fourth year's growth after being burned over. When, therefore, the heather is young and healthy, the grouse is in general correspondingly healthy, and, on the other hand, when the heath is a poor and deficient crop, they are weakly, poor, and diseased, affected, indeed, with what is known as grouse disease. No higher or stronger proof could well be adduced to show that there is a close and inseparable connection between pure healthy heath and strong healthy grouse, and *vice versa*, than the fact that all along the sea-coast, where the heather suffers nothing by frost, no grouse disease prevails, while inland, ten miles or so, beyond where the sea exercises its influence, then the grouse disease begins and extends far and wide, but never towards the shore. On dissecting birds that have died of the disease, it is found that the crop or stomach contains tops of heather that have been frost-bitten. Now, the connection between the grouse disease and the wet season of 1872 seems very evident. The heath, like other vegetable products, was imperfectly ripened, especially on the tops of the shoots, upon which the birds chiefly feed. In all localities where the effects of the frost were neutralised by the influence of the sea, extending generally ten miles inland, no grouse disease existed in 1873, or has ever been known to exist, while beyond these limits grouse have died by the hundred or the thousand. By referring to the map of Scotland, and comparing the localities where grouse disease was reported in the newspapers, it will be seen that the frost line, about ten miles inland, is the boundary also of the grouse diseased districts. It does not follow that an open winter with little frost is succeeded by a season free from grouse disease, but very often the reverse, because in a snowy winter with hard frost the heather is better covered and protected than in an open one. Indeed, as a rule, grouse are more healthy and free from disease the season succeeding a snowy winter than after a mild, open one. The tape-worm usually found in diseased grouse is also the result of frosted heath. Unfavourable hatching seasons will, of course, affect the number of birds injuriously, as will also cold, wet weather during their young and tender state. As no human skill can ward off frost, so no efforts can avail in preventing the disease under consideration, but the drainage of the ground, and keeping the heather pure, clean, and healthy by periodical burning, may very properly be exercised to prevent it. The one element of all others most deficient in 1872 was sunshine, and to this rather than the amount of rain or low temperature may be attributed the great deficiency of quality of probably every vegetable product.

The Hare.—No wild animal in this country suffers so much from cold and wet as the hare, and it is universally found that any protracted season of wet is succeeded by great mortality among hares. Whether it is that the food is so succulent and unnutritious that it cannot sustain the hare for its rapid movements, to which it is so frequently subjected by dogs, &c., or the cold wet lair to which she is destined day and night, we cannot say, but this we can confirm, that during the winter of 1872–73, and throughout the following summer, the mortality amongst hares was almost unequalled, especially on all flat and wet lands. On examining the dead animals it is found that they are unmistakably affected with dysentery, and are reduced to perfect skeletons before death ensues. The white or mountain hare is affected by wet cold seasons the same as the brown hare. In Badenoch, in Inverness-shire, white hares are at times so numerous that a party with guns can kill as many as a hundred hares each gun in a day. A wet season will occur, and the hares are affected with tape-worm like the grouse, till they are nearly destroyed. Rabbits, unlike hares, live in warmer quarters, in dry sandy burrows, hence are less affected by wet and cold than either white or brown hares; but they too suffer more in wet than dry seasons, and are much less prolific in cold than warm weather.

Pheasants in 1872 were late in being hatched, and the prevalence of cold and wet weather caused the death-rate in the pheasantry to be unusually high. The pheasant is a delicate and tender bird, and the parent proverbially a bad nurse. If the young brood is strong and healthy, and can follow the mother closely, all is well; but if the brood is weakly and their feathers get wet, they fare very indifferently, as the parent pays little attention to them, compared with the partridge or the grouse, &c. The partridge, though the hardiest of game birds, yet suffers by wet as compared with dry weather. The young birds of 1872 were, at the 1st of September, unusually small in size and of poor condition. This was probably the want of properly nourishing food. Clover, as an important article of their diet, was not to be got; and the turnip crop, which constitutes their staple winter's food, was both scarce and of inferior quality. The cover of the turnip field, too, which the partridge usually so much enjoyed, was denied them, as by reason of the dashing early rains and sleet the crops were broken and destroyed. It is indeed difficult to say whether the animal or vegetable creation suffered most from the effects of the wet season of 1872; for whilst the vegetable kingdom may appear to suffer most by outward signs, it is probable that in an indirect way animals suffered even more.

In dairy produce there was great deficiency. In some cases, the cow that usually produced (even in 1868) 1½ lbs. of butter per day, only yielded 1 lb., or scarcely so much, and in cheese manufactories the milk was found greatly deficient in curds. Hay was found to be sadly deficient in nourishing qualities, and it required much more of it to keep animals in condition than usual. Those also who kept studs of horses for racing, hunting, and other purposes, where exactness of feeding is scrupulously observed, found that they required considerably more corn to keep them in their usual condition than in ordinary seasons.

Clover.—Next to the failure of the potato and turnip crop, that of clover was the most signal. Upon good strong clay land and heavy loam, in a high state of cultivation, it either never germinated or died away shortly thereafter, as no trace of clover was found in the fields after the grain crops were reaped. To every rule there is said to be an exception, and in this case the exceptions were high upland districts. Upon poor dry land there the clover grew, and in some cases luxuriated, and produced an abundant crop of well-mixed clover hay the ensuing season (1873). In Banffshire, to which the above statements apply, mixed clover hay was scarcely to be bought, being only grown in small patches on dry ground at high altitudes. This is a proof of how injurious wet weather and prolonged cold is to clover, as compared with dry seasons, not even excepting 1868. The want of nourishment in the hay accounts, we think, in an eminent degree, for the unusual number of brood mares that died so unaccountably in spring and the early part of summer. They died of sheer weakness and debility. Many mares, though in apparently good health before giving birth, never once rose to their feet afterwards; and it was the opinion of many men not unworthy of regard, that the indirect cause of death was the absence of nourishment in their food, the produce of 1872.

Potatoes.—Since the first appearance of the potato disease in 1846 no such unusual failure has occurred. In our own case we did not take out of the ground, at the usual time of storing the potatoes, more than three times the quantity of bushels planted, and ours, unfortunately, was no rare or exceptional case in Banffshire. The richer and better the land the greater the failure. One farmer, a near neighbour, took up only three cart-loads instead of twenty or more, the usual quantity. Some fine varieties newly imported from America literally withered off the ground at Midsummer and entirely disappeared. No crop, whether cereal or root, thrives worse with wet than the potato, and none with which we are acquainted agrees so well with heat.

Turnip.—The turnip, like the potato, proved an almost total failure in 1872. The ground was never at any time in proper order for cleaning, and farmers delayed operations till the season was too far advanced to sow even the late varieties. Those that did sow hoped against hope to the last, always expecting that the weather would change in favour of the crop, and that after all they might be of some value. As the season advanced the ground became still wetter and the cold more intense. Dashing sleet showers and bleaching rains nearly consumed the green blade, of which, when the plant was denuded, little in the form of turnip remained.

The damage by floods was also alarmingly serious. In Yorkshire the damage to crops alone was estimated at over L.50,000; and even the parish in which the writer resides in Banffshire, and the one adjoining it, were visited by a flood on the morning of the 22d October, which in a few hours did damage to roads and bridges to an amount of over L.3000.

ON THE GROWTH AND MANAGEMENT OF SCOTCH FIR FORESTS BY NATURAL REPRODUCTION.

By JOHN B. WEBSTER, Forester, Churchhill, Verner's Bridge, Moy, Ireland.

[*Premium—Five Sovereigns.*]

THE Scotch fir (*Pinus sylvestris*) is undoubtedly one of the best and most valuable timber trees for general utility to be found in Great Britain and Ireland. It is also capable of accommodating itself to a great variety of soils and situations, and is equally at home on flat peat bog or the exposed sides of the M'Gillicuddy's Reeks in Ireland, and on the rugged glens and shelving rocks on the bleak sides of the Braemar mountains in Scotland. Its powers of natural reproduction are immense, and it is both instructive and interesting to watch its progress and the tenacity with which it will struggle for life under adverse circumstances.

At the bottom of some of the peat bogs in Ireland large specimens of this tree are to be found along with the remains of the *Megaceros* or elk; the latter is, however, found in the clay marl immediately under the bog—never in the bog itself. In some places, at a few yards higher elevation, a second stratum of trees and roots have been found immediately above the former, and in our own day and generation we find the same species of tree flourishing on the surface.

It is admitted on all hands that the British isles were at one time richly clothed with large and extensive forests; and from the ruthless way in which they were destroyed, and the great demand which we experience for timber of home growth, it is to be regretted that measures were not taken to have them replaced, and a more thorough system of management introduced in order to keep up supplies. No doubt much has been done and is being done in many places of the country to restore this woody covering; but keeping in view the vast tracts of naked hills and moors which we possess, and coupling this with the fact that it requires some 8000 acres of wood to be felled annually in order to maintain and keep our railways in a proper state of repair, it can easily be seen what a vast field still lies open for men of capital and enterprise to enter into; and had our ancestors taken the precaution, when cutting down the ancient forests of Great Britain and Ireland, and left a tree here and there to produce seed, and act as mother trees, the forests by this means would have been kept up by natural reproduction, thus affording a plentiful supply of timber, as well as a regular California of wealth to the owners.

In order, however, to illustrate the above, the writer will give a few practical examples.

No. 1 is a natural plantation of Scotch fir on the estate of Balmoral, Aberdeenshire, N.B. It is bounded for a distance of some two miles on the north by the river Dee, on the west for a similar distance by the Invercauld property, and on the south and east by Glengelder. The soil is composed principally of loose gravel, and in some places mixed with a small portion of clay resting upon granite rock, which crops up at some places above the surface. The ground at the east end of the forest (Garmaddie) has an ascent from the bank of the river to the top of the hill (Canopy or Carrop), and is naturally dry, with the exception of a few springs of water which ooze out on the hill-side; these required some channels to be cut in order to keep the water in due bounds, and from spreading over the face of the hill, but no other drainage was required. The oldest portion of the forest was on the north and west sides, and had been cut down many years ago; but on felling the timber a few of the old trees were left here and there over the surface to produce seed, and renew the forest by natural reproduction.

In 1853, and up to 1859, the writer had the supervision of thinning and manufacturing the wood required for the new castle of Balmoral, the whole of the home-grown timber for which was supplied from this forest. By counting the annual concentric rings of some of the old trees already referred to, their ages generally ranged from 200 to 300 years. In felling these old trees, when closely surrounded by their young progeny, it is sometimes necessary to have their strongest side branches cut off in order to keep them from crushing and injuring the trees in their immediate vicinity. This points to the necessity, when cutting down a forest, to leave as many of the seed-producing trees as possible near the roads and in places of easy access, so that they may be got at when wanted with as little inconvenience as possible; moreover, when these old trees are seen from the roads and drives, they are not only highly ornamental, but likewise afford considerable shelter.

All the brushwood and rubbish was generally collected int heaps during winter, and burned in the month of April; by this means the pine-destroying beetle and weevil were got rid of along with the branches, as it is about the beginning of this month that these pests begin to pair and commence their subcortical burrows in the wood in order to deposit their eggs. The forest is then said to be clean and in a proper condition for the young trees.

There are sometimes patches to be met with in the forest where there is little or no soil, and the surface too hard to afford a covering for the seed when shed from the trees; as for example, there was a patch of some ten acres in extent on the south side of the forest, at the base of the hill already referred to, where the whole of the stones were quarried for the new castle and other buildings, and from the traffic at the works the whole of this area was beaten as hard as a road. In March 1858 this patch was sown with seed at the rate of five to six pounds per acre; the operation was performed by two workmen, one of whom breaks the surface here and there about a yard apart by giving a scratch or two with a common draw hoe, while the other follows and drops a few seeds into each of the places so prepared; he then gives the place a scuffle with his foot in order to mix the soil with the seed, and the operation is completed. This system is often practised in the district of Mar in Aberdeenshire, in order to fill up gaps, and is found to be perfectly successful. In some cases the writer has sown the seed broadcast, allowing the same quantity per acre as already specified; after the sowing has been completed, it is found to be beneficial to allow the surface to be depastured by sheep or deer for the first season, as the tramping with their feet assists in settling and covering the seed on the surface. The cones should be collected from fine old healthy trees during winter, and the seeds extracted by placing them in thin layers on sheet-iron or tin, and exposing them to the influence of the sun on a warm day. In order to keep the sheet-iron or tin at its proper stretch, and for the sake of convenience, it should be nailed to deal boards, and the fixture made of such a size as will accord with the quantity of seed required. As the iron is a conductor of heat, by this means the seeds are safely and easily extracted without any risk of being deprived of their vegetative power through overheating, as is too often the case when they are extracted by the artificial system of placing the cones on a kiln.

Thinning.—Early and judicious thinning is indispensably necessary in the natural forest. In rearing woods by the artificial system the young trees, from being several times transplanted, are considerably dwarfed in early life, and bring up their thickness in proportion to their height; likewise, by being planted at a regular distance from each other over the surface, some ten or twelve years elapse before thinning is necessary; but in the natural forest all this is reversed, as the young trees make their appearance in an irregular manner, so that particular attention is necessary in the early management in order to have the young trees thinned out at places where they are too much crowded together, in order to prevent them from being drawn up too slender.

I have generally found it necessary to commence the first thinning when the trees are from 12 to 18 inches high; at this stage of their growth it is not necessary to mark the plants to be removed; the better plan is to have a certain number of hands thoroughly up to the work, and always employing them as long as the job may last. The ground should be staked off, and a certain space allowed to each workman; by this means order and regularity are secured as the work proceeds, and any careless or improper work can easily be detected by the forester, and the workman called to account. I have found from 3 to 4 feet a very suitable distance to leave the plants asunder, and particular attention should be paid to leave them as regular over the surface as possible, even although this should be attained by sometimes cutting out a larger tree than the generality, providing that by so doing, two or three plants, although less in size, can be left in a better position as regards distance and regularity. All bushes and surface herbage should be cut away, in order to give the plants as much air and room as possible, so that they may extend their side branches, and be prevented from being drawn up too tall and slender; in short, the whole aim at this stage of their growth should be to secure abundance of branches and leaves, and if this is attained the plants are sure to furnish themselves with a corresponding number of fine strong fibrous roots, thus securing a strong robust constitution in infancy, which is all-important for their future development into valuable timber trees.

The old trees, which were left to produce seed and renew the forest by natural reproduction, having accomplished the end in view, may be cut now, or at any future period according to the taste and wish of the proprietor; in the present case only a few of such trees were cut, as they were considered to be highly ornamental. The time of commencing the second thinning cannot be exactly stated, but must always be regulated according to the progress which the trees have made in different parts of the forest. In hollow, sheltered situations I have generally found thinning necessary when the trees were about 10 feet high and a corresponding number of years old, but on exposed situations from twelve to fifteen years often elapse before that operation is necessary. As a general rule, however, thinning should always be executed when the trees begin to get crowded, and the side branches meet and infringe one upon another. At this stage of their growth I have found it to answer remarkably well to thin out the trees in moderately sheltered situations to such an extent that those left stood about 5 feet asunder, or at the rate of about 1740 trees per acre; by this means the vitality of the side branches was preserved, so that the trees continued in excellent health, their annual increase in height being fully 12 inches, and the increase of stem fully 1 inch in circumference.

In thinning exposed situations great caution is requisite in order to keep the trees which remain from feeling any sudden change in the temperature of the atmosphere by being cooled down too rapidly after the operation has been performed; at the same time it is all important that trees growing under such circumstances be allowed plenty of room in early life in order to secure a robust habit and sound constitution. Under these circumstances, the better plan is to stem-prune a portion of the trees intended to be removed by cutting off two or three tiers of the lower branches with a hand-bill; by this mode of treatment the trees left never feel the want of those taken away, and the stem-pruned trees can be cut out progressively as circumstances may direct.

It is a great mistake in the management of fir plantations to leave the trees thicker on exposed situations than in other parts of the forest. The reason generally given for this system of management is, that it is necessary in order to break the blast and afford shelter; but the fact is, that under such treatment the trees soon get drawn up for want of a proper supply of air, the side branches wither and decay, the roots contend unsuccessfully with one another for more field and extension, the soil soon becomes friable, loose, and exhausted, so that they rock about with the wind, and by the time they reach some thirty years of age, if they are not laid prostrate by the blast which they were intended to defend, they present the appearance of a lot of half-starved things, with thick, dry, furrowed bark, loaded with cryptogamic growths, and quite incapable of either affording shelter or ever becoming useful timber trees.

On some of the most exposed situations at the top of the hill, at an elevation of some 1200 feet, the trees never attained a larger size than mere bushes or shrubs. In this case the trees had very adverse circumstances to contend with, namely, want of soil at the roots and severe climate. No management will ever bring the trees to be of much value in a commercial point of view, yet they are useful by way of affording game cover and shelter.

Having given a brief outline of the early management, we shall now give a detailed statement of the progress which the trees have made at different stages of their growth, as well as the number of trees progressively cut out, at every period of five years, from fifteen to sixty years, when the trees may be left to produce a full crop of timber.

The following table will give a summary view and illustration of the above:—

No of years old, and height in ft.	No. of trees on an acre.	No. of trees cut out.	Cubic content of each tree.		
			Ft.	in.	p.
15	1740	700	0	5	0
20	1040	240	1	0	0
25	800	200	1	6	9
30	600	125	2	6	7
35	475	75	3	10	8
40	400	55	6	3	2
45	345	45	8	7	4
50	300	40	10	6	0
55	260	25	13	9	0
60	235	15	16	3	2
...	220	...		...	

The trees referred to in the table were growing under favourable circumstances as regards soil and situation for their development, and were managed as near as possible to the standard as shown in the table. No pruning was necessary in the interior of the forest, as the side branches rotted and fell to the ground of their own accord; on the margins, however, where the trees were exposed to a fresh current of air, the lower branches, after losing their vitality, got quite hard and carbonised, and in order to prevent the formation of loose knots in the timber, these were cut off neatly close to the stems.

No. 2 is a series of plantations on and along the margins of extensive peat bogs on the estate of Churchill, county Armagh, Ireland. On the bog, in the vicinity of the plantations, large quantities of seedling Scots firs have appeared by natural reproduction. Taking the margins of the old plantations as a base, the young trees are gradually extending over the bogs. In places where no drainage has been executed and the bog quite wet, it is only on small hillocks, interspersed here and there through the bog, and a few inches above the general level of the surface, that the plants have made their appearance; in such places they generally look fresh and go on for a few years pretty well, but as soon as the roots dip and begin to extend, they come in contact with the cold moisture below, and their growth is immediately checked, so that they remain almost stationary in size, and their life is a mere struggle to prolong existence. By cutting up some of the plants I have found thirty-six annual rings in a stem one inch in diameter. In places where the bog has been drained the effect is marvellous, and one would almost be inclined to think that the tiny little plants had got a touch of the magic wand, as they gradually throw off their yellowish sickly colour, and assume that of a lively green, and commence to grow.

Where draining has been done the main leaders were cut six feet wide at top, two feet wide at bottom, and five feet deep; the intermediate drains were cut twelve feet apart, three feet wide at top, eighteen inches at bottom, and three feet deep. All heather and rubbish was collected into heaps and burned, as it is important to leave a bare surface on all soils which retain much moisture by capillary attraction, as the sun and air has a beneficial effect in lifting the moisture and dispensing it by evaporation. The stuff taken from the drains was all levelled out on the surface, thus forming a nice bed for the winged seeds when wafted by the wind from the old trees. In the course of three years—from 1861 to 1864—the bog so prepared in the immediate vicinity of the old plantations was found to be well stocked with young plants. In places at a distance from the plantations, where it was desirable to get up some groups for cover, I have sown the seed broadcast, using at the rate of from 5 to 6 lbs. per acre. The bog in this case was prepared in the same way as the former, and the results equal.

The early management in this case is a little different from that of No. 1. Trees growing upon raw newly-reclaimed bog have difficulties to contend with which trees growing under more favourable circumstances as regards soil are almost exempt from. Bog, although thoroughly drained, yet, from its retentive nature, retains by far too much water for the healthy development of trees, so that they have to extract and pump up the superfluous moisture and dispense it in vapour. This has the effect of assisting decomposition, and bringing the bog into a proper condition to act as the food of plants. Under these circumstances, the more branches and foliage which can be retained upon the trees from infancy up to twenty years of age the better, as they are all important in sucking up and dispensing the moisture. It therefore becomes necessary, in order to attain this, that thinning should be executed in a progressive manner, just as the side branches meet and begin to overlap each other; in short, I have never been able to rear finer or more healthy trees by natural reproduction on bog than by growing them as single specimens for the first twenty years of their existence. At this stage of their growth they may be allowed to get a little crowded, which will have the effect of killing the lower side branches, and inducing the stems to become more cylindrical and less conical in shape. All the drains require to be looked after and kept clean until such time as the trees are able to take up the moisture and render them dry; the leaders, however, generally require to be always kept in a thorough state of repair.

The rate of growth and average cubic content of Scots fir growing naturally on peat bog is about one-fourth less for the first twenty-five years of their growth than that of the same species for the same length of time, growing under favourable circumstances on good soil. After that date the bog is generally getting pretty well decomposed, and if the early management has been properly attended to, the trees may now be said to have conquered all inimical obstacles, and made a soil congenial to their growth and future development. On the other hand, should thinning have been neglected, which is too often the case, and the young trees been allowed to get drawn up, and the lateral branches lose their vitality for want of space, they may be said to be hopelessly ruined.

It has already been stated, on the early management of No. 1, that in thinning for the first time the young plants should be left as regular over the surface as possible, even although this should be attained by sometimes cutting out a larger tree than the generality, providing that by so doing two or three plants, although less in size, can be left in a better position with regard to regularity and filling up gaps. But had no thinning taken place, the trees that had a few years' start of the others would have shot ahead, and either killed or dwarfed all others within their reach; of course, the crop could not be so regular as trees under a proper system of management, but better a good tree here and there than a lot of bare drawn-up poles destroyed beyond redemption through mismanagement. The character and growth of this tree is greatly influenced by soil, shelter, and the size and quality of the seed from which the trees have been produced. In the natural forest there are at least two apparent varieties of this tree, but as seed produced by any of them produces trees of both varieties, and fails to keep their own distinctive character permanently, we come to the conclusion that they are only mere sports from the species. By dissecting a cone, the largest and best seed will be found in the centre; the trees produced from these seeds take the start of all others, and may easily be known by their strong growth and robust habit, and as their external appearance is somewhat different than in trees produced from the smaller seeds to be found at the base and summit of the cone, we shall give a brief description of each.

The trees raised from the best seed generally produce their branches almost in a horizontal direction and in regular whorls; as the tree gets old the branches have a tendency to bend downwards, forming a curve for a distance of about one-half their length from the stem, at which point the curve is reversed, thus forming a fine sweeping bend upwards to its extremity; leaves about two inches long, and often a little twisted; colour, dark glaucous green; bark smooth, and of a reddish colour; height, when full grown, about eighty feet; the leaves at this stage are much finer, and reduced about one-half in length; the upward growth gets gradually less from the time they are sixty years old, and by the time they reach about eighty feet high, which is their average height, the top is quite flat; when the timber is cut up, the heart-wood is fully developed, and found to be strong, tough, resinous, durable, and of a reddish colour.

The degenerate variety generally produces its branches in an acute angle from the stem; the whorls are less regular than on the former; leaves about two inches long, and of a pale slightly glaucous green colour, not twisted, and lie flatter on the branches; cones a size larger, lighter in colour, and tapering to a finer point; bark of a yellowish or buff colour, and generally rough and furrowed; when the tree gets old the leaves get a little shorter and finer, and the shape of the top is what is generally called "besom-headed;" the timber, when cut up, is of a whitish-buff colour, and the heart-wood never properly developed; the grain is coarse, short, and soft, and before the deals can be seasoned, they are *always* warped and twisted into a great variety of shapes, which renders them almost useless; it is also much lighter for its bulk than the former. By throwing down a log of the former upon the hard ground, the sound produced has a hard sharp ring like metal, while that of the latter produces a dull soft thud, so that the difference can be easily distinguished by the same test as that used for detecting a counterfeit coin. Owing to its inferiority, this class of timber was never used where durability was requisite for the new buildings at Balmoral. That the difference in external appearance, as well as the quality and growth of trees growing side by side, are often dissimilar, although the produce, not only of the seeds of one tree, but of one cone, is by no means confined to the Scotch fir. The same phenomenon often happens in other sorts of the coniferæ tribe; but as this is rather foreign to the subject in hand, we merely mention the fact without entering into details. In cases where the largest revenue is the object, the trees should be disposed of when they attain the age of from sixty to eighty years, as they make less progress in cubical contents after that date, which the following measurements, taken in the Balmoral, Ballochbuie, and Braemar forests will illustrate.

In a regular crop of fine timber growing under favourable circumstances, the average cubic contents per tree at 60 years old is 16 feet; at 200 years old, 25 cubic feet, and from 90 to 100 trees per acre; in some of the best parts of the forest from 30 to 35 cubic feet per tree, and from 120 to 130 trees per acre. The height of the trees range from 70 to 80 feet, and the stems straight as an arrow, and branchless up to about 50 feet. There are older and much larger trees in the Braemar district, but these are exceptional, and not a general crop. Again, on inferior situations, with a moorband pan near the surface resting upon clay, the average cubic contents per tree at 60 years old is 8 feet, and at 100 years old 10 feet. There are, however, cases where we have known the roots of the trees break up the pan, as, for example, on a piece of hollow ground in the form of an ellipse, which was always full of water on account of a hard crust of till near the surface resting upon shingle, the roots of the trees around its margin gradually broke up the till, and from the open nature of the subsoil the water escaped, and the young trees took possession of the whole area, and from their appearance there is every reason to believe that a good crop of timber is in prospect.

ON THE MOST PROFITABLE VARIETIES OF TREES FOR PLANTING WITH A VIEW TO EARLY REALISATION AND PROFIT, ESPECIALLY WILLOWS AND POPLARS.

By Robert Hutchison of Carlowrie, Kirkliston.

[*Premium—The Medium Gold Medal.*]

The art of the planter has been aptly described by an ancient classical poet as "living for posterity," and in olden times he who formed plantations upon his estates was looked upon as the benefactor of future generations.

> "Jam, quæ seminibus jactis se sustulit arbos,
> Tarda venit, seris factura nepotibus umbram"—
> *Virg. Geor*, lib. II.

This was probably owing to the descriptions of trees which were looked upon formerly with favour as timber trees, such as the oak, whose slow growth rendered all hope of their realisation during the lifetime of the planter a remote contingency. Less was known, also, of the nature and habits of trees, and of their suitability to particular sites, soils, and exposures; and consequently planting was carried on in a more promiscuous manner in former times, and with less attention to those means which are attainable to insure the most successful crop of timber within the shortest possible period.

Before the days of Evelyn, who lived 1620–1706, planting operations in England appear to have been the subject of no study or careful observation, and men's minds do not appear to have been occupied with any ideas of increasing or accelerating the products of the woodlands. The impetus, however, given to arboricultural observations, and to improved and extended systems of treatment by that eminent and accomplished lover of nature, were the first dawnings of a more intelligent mode of management of plantations, and indeed, of all sylvan subjects; for not only did Evelyn, as was well remarked by Bishop Burnet, in acknowledging some valuable observations from him, "not rest satisfied to have advanced the knowledge of this age by his own most useful and successful labours about planting, and divers other ways, but was ready to contribute everything in his power to perfect other men's endeavours."* Gradually, through the intervening centuries, has arboricultural knowledge taken definite form; the introduction of numerous varieties of trees and shrubs from all quarters of the habitable globe has been steady, and within the past century most important. The treatment and acclimatisation of these species, and the acquirement of a knowledge and accurate estimate of their habits, peculiarities, and uses, has further tended to foster the thirst for scientific forestry, or, more properly speaking, for the cultivation of every tree in this country, under those principles only which are dictated by an accurate knowledge of nature herself, so that we now live in an age when there is probably no branch of rural economy more actively engaged in settling itself into well-trained lines of action in regard to the subjects of its special department, than forest-management. No doubt, the more widely diffused knowledge and better understood laws of chemistry, meteorology, and other kindred sciences have largely contributed to the improved status of arboricultural skill; but, at the same time, the intensely *practical* age in which we move along with such whirling velocity, when, day after day, new appliances are introduced and tested, only to be the next themselves supplanted by other novelties, has had some share, and no inconsiderable one, in pushing ahead experiments in forest schools and home plantations, which have led to considerable alterations, modifications, and innovations in the generally accepted rules of planting and tree culture. Hitherto, a plan for furnishing a park or plantation or ornamental ground, with full grown ancestral-looking trees "*upon the shortest notice*," as many of the countless advertisements of the current age now run, has not been discovered; but science and observation have done their best to mitigate the sickness of the hope deferred of many an impatient planter of the present day, by the introduction of the various transplanting machines for trees of larger bulk, and by the selection of some varieties of rapid growth under suitable circumstances. That the necessity exists for further and more extensive introduction of varieties of trees which, by their quick growth and early maturity will repay their planters by early profits, there can be no doubt. Any one sceptical upon the point has only to look at the immense and rapidly increasing strides with which every manufacturing industry of the country is progressing. The demand for wood of every description, at enhanced prices, and the great scarcity of supply existing in many descriptions, will also corroborate the statement, and especially so when it is added that the demand is greatest, and the scarcity most apparent, in those very classes of trees of rapid development, namely, willow and poplar. During recent years the consumption of willow as timber for the numerous railway networks of systems over the length and breadth of the country, has been enormous. Its universal adoption and peculiar suitability for the blocks of the brakes, &c., of waggons and other railway vehicles, have induced great scarcity of wood of large dimensions; while the more general application of poplar of good quality for many country purposes for which, before the introduction of the larch disease, that tree was used, has contributed to a great increase in the demand for well-grown poplar wood. Indeed, the substitution of poplar for larch is, in many parts of Scotland, now very general; for in addition to the risk of failure of the larch crop by disease, and its being a tree which requires a longer time to produce wood of relative value than poplar, there are many more useful purposes for which the wood of this latter named tree is found to be better adapted than young larchwood of from fifteen to twenty years' growth. Consequently, the introduction of poplar trees in young plantations mixed with spruce, or Scots firs, and larch, to be used as nurses, seems too much neglected. The comparatively quicker maturity, *for sale purposes,* of the poplar trunk, renders it a very desirable tree to be used for such purposes, and the variety of soils to which it can, without detriment to its rapidity of development, accommodate itself, makes it capable of very general application in most situations where plantations are being formed, or where any of the other common nurse trees are employed. Judiciously mixed in this manner, the poplars may be thinned out first, along with the Scots fir, and thus allow the larches to remain, if they should prove to be a healthy and thriving crop, till they become of more value from their larger growth; while in the meantime a better return is obtained from the poplars than would have been produced had larch alone been used instead of them, and cut when the wood first required to be thinned.

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* Life of John Evelyn, by Dr Hunter. London, 1825.

The variety of poplar most suitable for this purpose, and indeed the best of all the class of fast-growing timber trees, is the black Italian (*Populus monilifera*). Reference has already been made to the value of this tree in a recent issue of the Society's Transactions, so that it is almost superfluous again to record its distinctive qualities and merits. Suffice it to say, that the more general cultivation of this useful and desirable poplar for timber purposes is well worthy the consideration of every

Scottish planter. Although this tree, like the other poplars as a class, will thrive in almost any soil, and attain to considerable size in a very few years, it prefers, and will grow most rapidly, when planted in a deep moist loamy soil, and makes most wonderful annual growths of young wood in damp, although sandy, alluviums beside river banks or level flats. The height to which a full-grown poplar of this variety will attain is about 120 feet, and this altitude it will reach in sixty years in suitable soil and situation. The uses to which its timber are adapted are numerous, and owing to its toughness and lightness it is well suited for any constructive purpose. In localities whence there is easy and convenient means of transit to any of the great centres of industry and manufacture poplar wood of fair size, from about 2½ to 3½ feet diameter at the base of the trunk, will fetch from 1s. 3d. to 1s. 4d. per cubic foot, and frequently a higher price. In this respect, grown solely as a crop, this species of poplar, in the same given number of years, will be found to be a *safer* and *more remunerative* tree to plant than almost any other. Other varieties of poplars are also worthy of notice as being "*early remunerative trees*," and should be much more extensively cultivated. We refer to the common grey poplar (*Populus canescens*), the white poplar (*Populus alba*), both of which are decidedly worthy of much more attention than arborists have hitherto given them, and will be found to be trees of very useful value as timber for country purposes. The grey poplar is indeed a very potent rival to the black Italian, but we prefer the latter as yielding a timber of much higher quality for every purpose than the former named tree will yield at the same age. This last mentioned tree, the grey poplar (*Populus canescens*), is also much esteemed by many planters, and is deservedly prized for its striking foliage and cold grey tints, when skilfully blended with warmer hues in the landscape, no less than for its intrinsic merit as a useful "country-wood" producing tree. It yields a light, tenacious, durable quality of timber, and is an equally rapid grower with the black Italian poplar.

The other varieties of poplar, such as the Athenian (*P. græca*), the black poplar (*P. nigra*), the white poplar (*P. alba*), and the Ontario (*P. candicans*), may be all held as fast-growing trees respectively, and worthy of attention to some extent where variety of foliage and habit in a mixed plantation are desired; but as rapid producers of wood of any considerable value, we must limit our recommendations to the two poplars previously named, *P. monilifera* and *P. canescens*. In planting poplars it is very necessary to give due attention, in the young plantations or strips, to "*clear head-room*" to the young trees, for the poplar is of itself not very prone to throw up a vigorous leader, while the rubbing and fraying of neighbouring shoots too frequently destroys the tender soft bark of the young wood of the main stem, where early thinning has not been attended to in due season. Poplar trees in strips and plantations may thus be frequently seen to be permanently injured from this cause, and if really good specimens are desired in after years, it would be well to clear out all round the specimens left. The return from the sale of the wood of the grey poplar of similar age to the black Italian is about the same under ordinary circumstances, and we find that, at some timber sales lately, vigorously grown trees of the grey poplar fetched as much as 1s. 2d. and 1s. 3d. per cubic foot, being about 2 feet in diameter at the base; and in other localities, similar, if not better, quotations were realised at recent sales for similar sizes and equal quality.

Having thus cursorily noticed the principal members of the poplar family which are deserving of wider introduction into the woodland scenery and economic planting of this country, we shall proceed to notice those varieties of the *Willow family* which are worthy of more attention than they at present receive, as being trees of rapid growth, producing good and useful timber, and as being decidedly entitled to be fairly ranked amongst the foremost species of forest timber trees, as subjects worth planting, as *early remunerative trees.*

The rapid growth of the willow is a matter of universal admission. From the earliest Scripture times we are told of this habit of quick development when in suitable localities and situations. Thus "they shall spring up as willows by the water courses;" and the very derivative name "*Salix*," under which the whole class is enumerated, signifies *to spring*, and is thus characteristic of the habit so well known of the plant. The varieties of the willow family are well-nigh *countless*. Loudon enumerates some 282 varieties as well known and in cultivation. The general features and broad outlines of the family are their rapidity of growth. The soft, porous, light, and uninflammable nature of the timber, and its general suitability for country purposes, to which ordinary hardwood and fir are quite inapplicable, but in regard to which its toughness renders willow or saugh peculiarly adapted, and combine to make this tree worthy of more extensive cultivation. The covering or "cleading" of cart bottoms and railway waggons, and the manufacture of brake-blocks, form a considerable source of demand for the timber of large well-grown willow trees, and there are many other purposes to which this wood is specially adapted, and for which it is largely used.

Passing over for the present the treatment of the willow as a crop (grown as wands), and the remunerative advantages of this mode of utilising wet lands and damp situations, where from peculiarity of situation drainage is difficult, we notice only the question of the value of the willow as a timber-producing tree. Unfortunately, in this country the willow is too often thrust into the background as a tree worth planting for the value of its wood, and is planted only or chiefly in damp marshy corners, where it is frequently neglected, and allowed to grow up without any regard to the formation of a good bole, or, in fact, without any reference whatever to its ulterior use. Were some little care and attention paid to this handsome species of trees, even in such waste situations, the trouble and expense would amply repay the planter. Indeed, there is no department of forestry that yields a better return than cultivating these rapid-growing timber trees, such as the willow and poplar. In the commercial world small profits and quick returns are now-a-days the acknowledged maxim of correct mercantile policy; and similarly in forestry, whatever plan of management, planting, or beating up be adopted, and shows the most probable prospect of future advantage, *at the earliest date*, is sure to be at once recommended and put into practice.

It is very difficult indeed, out of 282 varieties of the Salix or willow family, to single out one or two of the most suitable and advantageous for general planting as timber trees; but at the same time, though there may appear 282 varieties, botanically speaking, these may be reduced to a very much smaller compass when they are treated of collectively *as timber trees.* In fact, they present frequently so few features of distinctive merit or difference, that the number might be very safely reduced to a much smaller list of distinctive individual trees, worth growing for their timber in suitable soils and situations throughout Scotland. Indeed, after a careful analysis of all the species, it appears that the entire list of willows, which may be regarded as claimants for popular favour as timber trees, may be simply reduced to four distinct varieties, viz., *Salix alba* (the white or Huntingdon willow), *Salix caprea* (goat willow or saugh tree), *Salix Russelliana* (Bedford willow), and *Salix fragilis* (red wood willow). Of these varieties, the first named, viz., the Huntingdon willow (*Salix alba*), is probably, when unpruned and grown naturally in favourable circumstances, the handsomest and finest of all the willows of really tree dimensions. It is, in truth, a most picturesque and beautiful tree, whether it be regarded for its general outline and habit, or for the peculiar and distinctive whitish appearance of the foliage, which, combined with its general light and elegant outline, contribute to render this one of the most favourite trees for planting in such situations as conduce to its early and full development. Such situations are river banks in deep, damp alluvial soils in flat marshy ground, and upon those low-lying swampy situations so well known and common in Scotland, where few planters care to risk a general crop of timber trees. This willow, which we deem worthy of far more universal cultivation in this country than has hitherto been attempted, has, like many other varieties of its tribe, the advantage of thriving very well indeed in rather poor soils, and in thin sandy stretches or on damp subsoils. Certainly most trees will thrive better in deep rich loamy soil, with rather a damp subsoil, than in a poor thin one; but the only point of importance to be observed now-a-days is, that the soil (whatever its nature may be) shall be well drained from stagnant water, and trees of magnitude, such as the white willow, grey poplar, and other rapidly-growing timber trees, will all benefit immediately. Thus in cold upland situations not only may the grey willow, but also the Bedford willow (*Salix Russelliana*) be grown with profit and advantage. In any situation or soil, with damp bottom, the progress made by the grey willow is truly marvellous. The plants so situated soon attain considerable height, and rush up with clean, straight boles when planted closely, and yield timber of no small value in a very few years. It has been observed that the annual increase in timber of the grey poplar, in trees of about twenty years of age, is at the rate of about two cubic feet in suitable situations,—certainly no inconsiderable rent for the ground occupied by the tree,—and this measurement has been verified in more than one place both in Scotland and England; and in some soils trees planted eighteen years ago have now attained, in strong clayey loam, fully 52 feet in altitude, and girth about 7 feet in circumference at 1 foot from the ground.

The wood of the *Salix alba* is used for a variety of wright-work. It is peculiarly light, tough, and easily wrought, and is adapted for a great number of country purposes,—such as cleading of carts and waggons, railway brakes, planking and joisting boards, and for many purposes in connection with mill-wright work; tool handles, hoops, cooper-work, and basket-making. Indeed there is no part of this tree, from its thick and heavy trunk to the youngest twig, but is adapted to some use. The bark of the grey willow abounds in tannin, but does not appear to be sufficiently appreciated, and is worthy of more notice in this country for the purposes of the tanner. In this respect it appears to be much more generally used on the continent of Europe.

The facility with which this tree is propagated, and rushes up into shape after being planted, is another recommendation to its future increased introduction.

All that is requisite to commence a willowry or plantation of this tree is to insert into the soil cuttings made from one or two years' wood (about 2 feet long) to the depth say of 10 inches to

1 foot. Stobs made of this tree of greater thickness, say even up to 4 to 6 inches in diameter, succeed very well in damp subsoils, and many fine large trees have been grown from them, although, upon the whole, and in a variety of soils and situations, trees grown from the smaller sizes are preferable.

The next variety of willows, well worthy of culture in this country, is the large-leaved or goat willow (*Salix caprea*), commonly called "the saugh." Although it can hardly be said to acquire a great height and large dimensions, there are, nevertheless, examples throughout the country of immense size, considering the habits of the tree. It thrives in any soil or elevation, but will attain its highest height and dimensions in a dry, rich, deep, loamy soil, with a cool, if not dampish bottom. The wood of the saugh is tough and elastic, having considerable lateral as well as longitudinal adhesion, and admits of a very fine polish. It is of considerable value for jobbing purposes; but the white willow (*Salix alba*), in point of utility as a timber tree, beats this variety completely. The price which the *Salix caprea* will realise in a sale is about the same (according to district) as that of the larch or birch-wood. It is very profitable as an undergrowth in many plantations, for in favourable seasons it will yield young shoots fully 5 feet in one year; and very suitable for the purposes of the crate-maker or basket manufacturer. The bark yields a large amount of tannin.

Another member of the willow family worthy of notice is the *Salix fragilis*, or red-wood willow,—a tree regarding whose utility there is considerable difference of opinion. On the one hand, its timber has been condemned by some arborists as useless; and they have further asserted that the qualities usually ascribed to it are due to another species, with which they say it is confounded, viz., *Salix Russelliana;* while, upon the other hand, its suitability, on account of durability, lightness, and toughness for many purposes, whether local or for ship-building, for which it is well adapted, renders it worthy of more notice than it at present attracts in our plantations, where damp soil, with deep alluvial subsoil, foster its rapid growth. Its wood is likewise available and very suitable for constructive purposes, for houses, water-wheels, planking, &c., and indeed for all country work, where a really good, clean, light, tough, elastic, and useful wood is required. One considerable drawback to this willow is its liability to become dead in the top shoots, or "stag-headed;" and as this habit is of frequent occurrence, this variety is in much less repute than the *Salix Russelliana* or *Salix alba* as a timber tree of rapid growth. It will thrive best upon a stiff, damp, clayey soil, with cold subsoil. The wood is, when cut, red in the heart, with a white margin, and upon being exposed to the influence of the air for a time, the whole assumes a reddish pink hue of agreeable appearance, and of a consistency easily wrought, and of a very useful texture for any domestic or rural purpose.

The other species of willow which has been mentioned as worthy of extended cultivation in this country was the Russell or Bedford willow. Resembling as it does the *Salix fragilis,* already described, it is rather more graceful and elegant in its foliage and contour; and indeed, in the case of large and well-grown trees, the *Salix Russelliana* exhibits a far finer outline than any other of the congeners of this family. Its rapidity of growth is fully equal to that of *Salix alba,* and far superior to that of the other members of the willow tribe already described. Its timber is about equal to that of the *Salix alba.* While light, tough, elastic, and unlikely to crack or split, its timber is highly prized in the building of manufactories, and for flooring and such like purposes; for its non-combustive properties, coupled with its non-liability to shrink or crack, render it very useful in the building of many edifices,—such as mills, manufactories, granaries, &c. It is also, like its other neighbours of the willow and saugh tribes, greatly used for cleading cart and waggon bottoms, making railway brakes, lining coal-pits and stone or lime quarries, and for almost any purpose connected with rural economy. This willow succeeds best in a deep moist soil of medium description, but is decidedly unsuited to situations where water is stagnant in the subsoil. It will also thrive and produce good timber upon cold clayey soil, if there be due regard to drainage of the till beneath. Upon the whole, the *Salix Russelliana* is very decidedly a tree to be extensively planted, in conjunction with the *Salix alba* and *Salix fragilis,* upon exposed uplands for timber purposes, and in such situations it will yield a quick and good return to the planter. It should be grown in masses, for in such circumstances it is far more profitable than when planted as a single specimen or hedge-row tree, or when mixed with others whose too rapid side-spreading growth may interfere with its head or stem.

There are other members of the willow family which might be named amongst the list of quick-growing trees, and which are suitable for many country purposes; but the four varieties which have been noticed in this paper are in themselves the embodiment of all that is essential for a good timber tree of rapid growth and correspondingly quick return to the planter, and they are well adapted for any soil or situation.

Many others of this large and interesting family might be named whose returns, as a crop, are probably superior to those of the varieties we have named, but these fall to be discussed under the head of osiers, and for mechanical application under the head of basket-weaving and such like uses; and there is ample scope for a separate paper to discuss the various varieties of willow most adapted for that manufacture, and for considering the large profits derivable from the careful culture of the different species most suited for these and similar purposes, and which do not properly fall within the province of this paper.

REPORT BY A COMMITTEE OF THE SOCIETY ON THE RESOLUTIONS ADOPTED BY MEETING OF MEMBERS HELD AT ABERDEEN ON THE 24TH OCTOBER 1873, APPROVED OF AT MEETING OF DIRECTORS, 4TH MARCH 1874.

Note.—In the following Report the Resolutions of the Aberdeen Meeting are given *seriatim*, followed by the remarks by the Committee on each.

Resolution 1. "That this meeting heartily acknowledges the benefits conferred in the past by the Highland and Agricultural Society of Scotland upon agriculture in Scotland."

The Directors acknowledge and highly appreciate the good feeling displayed in this resolution.

2. "That, looking to the amount of capital and of annual revenue which the Highland and Agricultural Society of Scotland now has at its command, the time has come when it ought to make new and more energetic efforts for the development of agriculture."

The notes on the following resolutions will show that to a great extent the wishes of the deputation on this head had been anticipated, and that the increased expenditure proposed for 1874 will fully exhaust the income of the Society.

3. "That greater liberality should be shown to exhibitors at the annual Show, and more provision made for the accommodation of attendants on stock."

From the report of the meeting this resolution appears to have embraced four points, viz., (1.) Reduction of stall rent; (2.) Supplying forage free of charge; (3.) Increasing the number of money premiums; and (4.) More provision for the accommodation of attendants on stock.

(1.) Under the first head it may be remarked that the sum charged for stall rent from members is much below what the Society pays the contractor who erects the show-yard. For instance, the charge for cattle stalls is 10s. per stall, while on last occasion the Society paid 16s. 6d. For mares and fillies the charge is 15s., and the contractor's rates are 18s. 6d. and 16s. 6d. respectively. For sheep and swine the stall rent is 8s. per pen, but the Society paid from 9s. 6d. to 15s. 6d. Implement shedding is charged 2s. per foot or 6s. per yard, while the Society paid 8s. 3d. per yard. The result was that

The Society paid the contractor for stalls for Stock		L.879 8 3
And received from exhibitors of stock, including non-members, ...		690 19 0
		L.188 9 3
For Implement Shedding the contractor was paid	L.200 1 3	
And the Society received from exhibitors, including non-members, .	136 14 0	
		63 7 3
The difference between the sum paid and received being		L.251 16 6

In addition, the Society paid the rent of the field and drainage L.100, and for water laid on L.119, besides the erection of the boundary fence. The committee cannot, therefore, recommend any reduction on the charge for stall rent.

(2.) The second point is the supplying of forage free of charge. This has already been done by the Society on the occasion of the last two Shows. The daily allowance to each animal during the four days of the Stirling Show last year was as follows:—

Horses and Cattle.—14 lbs. of hay, or 6 bunches green food; 2 stones straw first day, 7 lbs. the following days.

Sheep.—Single sheep, 2 lbs. hay, or 1 bunch green food; 7 lbs. straw first day, 3½ lbs. the following days. Pens of five sheep, 10 lbs. hay, or 5 bunches green food; 14 lbs. straw first day, 7 lbs. the following days. Pen of five sheep and lambs, 15 lbs. hay, or 7 bunches green food; 21 lbs. straw first day, 10 lbs. the following days.

Swine.—Single pigs, 2 bunches of green food; 14 lbs. straw first day, 7 lbs. the following days. Pens of pigs, 4 bunches of green food per pen; 14 lbs. straw first day, 7 lbs. the following days.

These quantities have been stated by several of the exhibitors to be ample, and it was believed that the forage arrangements were quite satisfactory. The sum paid at Stirling for fodder and bedding for stock was L.230, 17s. 2d.

(3.) Under the third point it may be noticed that the Marquis of Huntly was informed by the Secretary on the 22d of October, that before any movement took place in Aberdeenshire the matter "was considered, and that likely, when the General and District Show Committees meet next month, a large addition will be made to both the number and value of the Premiums." The list for the

Inverness Show has now been adjusted and approved of both by the Directors and by the members in the district connected with the Show; and on reference to it, it will be found that, while the medals have been withdrawn, the number of money premiums has been increased from 335 at Stirling to 437 at Inverness, amounting in all to L.2030, 16s., or L.170, 11s. above what was offered at Stirling last year, and to L.730 more than the sum offered at Inverness in 1865. The Directors are always ready from time to time to consider proposals on this head, and to receive suggestions for the advancement of the objects of the Society.

(4.) With reference to the fourth point it may be mentioned that the Society provided sleeping accommodation for servants at Inverness in 1865 and at Glasgow in 1867, for which a small charge was made, but the servants generally did not avail themselves of it. In future, it is proposed that a small booth at the end of each row might with advantage be set aside for attendants on stock. They would be in close proximity to the animals under their charge, and ready to attend to them if required.

4. "That greater encouragement should be given to local shows."

The system of aiding and directing the efforts of local societies has long been a leading feature in the Society's operations. The first attempt at local shows was in 1789, when premiums were offered for bulls of the Highland breed in Argyllshire. Other classes of stock were from time to time added, and the number of districts gradually increased. For many years prior to 1870 the rule was to have twelve districts for cattle, two for horses, and twelve for sheep; one-half of the number for cattle and sheep being in competition for the Society's premiums and the other half for local premiums. In 1870 the numbers were increased to sixteen for cattle, three for horses, and sixteen for sheep, the cattle and sheep premiums being still given in alternate years. For 1874 the Directors, anxious to carry out the suggestions made at the general meeting in January 1873, have sanctioned a still further increase, and the following scheme has been suggested for the approval of the general meeting on 21st January 1874, viz.:—20 districts for cattle; 6 for horses; and 20 for sheep (the cattle and sheep in intermediate years as formerly), adding a medium silver medal to the first prize, and giving a money premium of L.1, in place of a minor silver medal as a third prize in cattle, mares, and 2 years old colts and fillies; and a premium of 10s. in place of the minor silver medal, in the class of 1 year-old colts and fillies, sheep, swine, and dairy produce. This, with some additional districts for medals will make the sum to be offered in 1874 amount to L.1338, 12s., viz.:—

District Shows,				L.1187	7	0
Cottages and Gardens,				151	5	0
				L.1338	12	0
Amount offered in 1873—						
District Shows,	L.840	11	6			
Cottages and Gardens,	137	12	0			
				978	3	6
Increase of sum to be offered,				L.360	8	6

5. "That the Society's present mode of conducting investigation in practical agricultural science might be improved so as to yield greater results; and that experimental stations should be established in various districts of the country, under the care of a highly qualified person, whose attention should be devoted to agricultural science."

The chemical department has now been in existence for about twenty-five years, and until March last has been under the entire charge of Dr Anderson, to whose services very distinguished testimony has on various occasions been borne. At first the objects were:—(1). The prosecution of researches in various subjects connected with agricultural chemistry, the results of which have been published in the Transactions. (2). The performance of analyses of manures, soils, vegetable products, &c., for members of the Society at reduced fees. In 1865 it was resolved to extend the usefulness of the chemical department by instituting field experiments on a systematic plan, conducted in different districts under the superintendence of a committee. The results of these experiments have been published in the Transactions. In March last Mr James Dewar was appointed assistant chemist, under whose personal superintendence and inspection field experiments were to be conducted in a limited number of districts, where a local committee of members make application for them, and contribute two-thirds of the expenses incurred. It was at the same time resolved that Mr Dewar should deliver lectures in a limited number of districts, on application from a local committee of members, and on payment of a fixed charge, in addition to travelling expenses.

Since the Aberdeen resolutions were received, the resignation of Dr Anderson, owing to ill health, has been tendered; and as the Directors have the whole chemical department now under consideration, it will be their duty to give due weight to the suggestions contained in this resolution, when re-adjusting this department.

6. "That a general meeting of the Society should be held at the time and at the place of the annual show."

By the Charter the Society holds two general meetings in each year—one in January, the other in June or July. And it is in the power of the Directors to call occasional general meetings, previous intimation of such general meetings, and the purpose thereof, being made by advertisement at least ten days before such meeting. The committee are of opinion that any change in this matter would be very inexpedient. Any local general meeting must necessarily be a very partial one, not representing the general body—the time of the deputation of the Directors and the officials of the Society is completely engrossed by the details of the Show. General meetings are restricted, as they should be, and are by the Charter, to general subjects, and could not enter into details without previous preparation from the Directors. The two ordinary meetings afford sufficient opportunities for bringing forward points to be remitted for that consideration which is necessary by careful investigation.

7. "That in order to secure a wider and more general representation in the management of the Society, provision should be made for electing Directors by signed lists forwarded to the Secretary."

The power of choosing a President, Vice-Presidents, Directors (ordinary and extraordinary), is by the fourth regulation of the Charter vested in the Society at the general meeting in January. These office-bearers are empowered to "manage and direct the ordinary business of the Society in all matters, in compliance with the constitution, bye-laws, and regulations of the institution." Bye-law No. 5 states that "the list of office-bearers to be proposed by the Directors for election at the general meeting shall be published in any two or more of the Edinburgh newspapers fourteen days preceding. The committee are of opinion these rules should be adhered to. The Charter ordains that the ordinary Directors shall be chosen out of those who are usually resident in Edinburgh or its immediate vicinity; but the Directors, owing to the change produced by railways, have for some time been widening the range, their endeavour having been to secure the services of gentlemen resident in various parts of the country, keeping, at the same time, a portion within reach of Edinburgh to secure a due attendance. The Committee, however, remind the Directors that the Society can by a bye-law modify this part of the rules, and accept suggestions from any member desirous to make them. The Directors propose to carry through a new bye-law giving the members a power to suggest to the Directors names from whom may be selected those to be recommended to the General Meeting.

8. "That it would increase confidence in the decisions at the general Show if some rule were adopted giving exhibitors a voice in the selection of the judges."

This suggestion is directly opposite to what has long been considered a fundamental rule in the selection of judges. With the view of preventing the existence of anything like jobbing, or an imputation of partiality, all interference on the part of exhibitors has been strictly discouraged, and a nomination by an exhibitor in the class in which he shows is considered a disqualification, however pure the motives of the proposer, or high the qualifications of the nominee. It is the practice for the Secretary to submit to the Directors a list comprising the names of a number of persons known to be qualified for each breed; this list is reduced by the Directors, and the requisite number of judges, with a spare nomination to meet the case of a refusal, is selected. Under this head the Special Committee on General Shows reported in 1859 that the principle of excluding exhibitors from all say in the nomination of judges should be adhered to and rigidly enforced. The finding of the said Special Committee was submitted and approved of by the Directors in January 1859,—was before the adjourned General Meeting in February 1859,—was published in the Transactions for March 1859, and has been acted upon ever since.

9. "That a deputation, consisting of the chairman, the proposers and seconders of the resolutions, Lord Saltoun and Sir J. D. H. Elphinstone, Bart., M.P., should be appointed to lay these resolutions before the Directors of the Society at the next general meeting, and to support the views of this meeting."

According to appointment, the deputation waited on the Directors at eleven o'clock on the morning of the 21st January, immediately before the general meeting. The deputation consisted of—The Marquis of Huntly; the

Earl of Aberdeen; Mr Barclay, M.P.; Mr Cochrane, Little Haddo; Mr Copland, Mill of Ardlethen; Mr Ferguson of Kinmundy; Mr Harris, Earnhill; Mr Scott of Brotherton; and Mr Walker, Portlethen.

The Directors approved of the Report of the Committee on the resolutions adopted at Aberdeen on 24th October 1873, and agreed to adopt the same; at the same time the Directors are desirous to convey to the noblemen and gentlemen who formed the deputation, and to all the gentlemen of the districts which they represent, their anxious desire to meet their wishes and to extend the benefits of the Society to the utmost of their power.

APPENDIX (A).

PROCEEDINGS AT BOARD MEETINGS.

MEETING OF DIRECTORS, 5TH FEBRUARY 1873.

Present—The Marquis of Lothian; the Earl of Dunmore; Sir Archibald Hope of Pinkie, Bart.; Sir William C. Bruce of Stenhouse, Bart; Sir William Stirling Maxwell of Keir, Bart.; Sir Henry J. Seton Steuart of Allanton, Bart.; Admiral Sir William J. Hope Johnstone, K.C.B.; Professor Anderson, Glasgow; Professor Balfour; Mr Leslie Melville Cartwright, Melville House; Mr Ford, Hardengreen; Mr Harvey, Whittingham Mains; Mr Milne Home of Wedderburn; Mr Hunter of Thurston; Mr Irvine of Drum; Mr Small Keir of Kindrogan; Mr Mackenzie of Portmore; Mr Kenneth Mackenzie, C.A.; Mr Munro, Fairnington; Mr Smollett of Bonhill; Mr Campbell Swinton of Kimmerghame; Mr Swinton, Holyn Bank; Captain Tod of Howden; Professor Wilson; Mr Pettigrew Wilson of Polquhairn; Mr Seton Wightman of Courance; Mr Young, Keir Mains. Professor WILSON, and afterwards the Marquis of LOTHIAN, in the chair.

Mr F. N. MENZIES reported apologies for the absence of Sir William Forbes of Craigievar, Bart.; Sir George Macpherson Grant of Ballindalloch, Bart.; Mr Curror, The Lee; Mr Glennie, Fernyflatt; Mr Johnstone of Alva; Mr Murray of Dollerie; and Mr Walker of Bowland.

MISCELLANEOUS REMITS.—It was remitted to the Committee on the Chemical Department to look out for a competent assistant chemist, and to report full particulars; to Mr Milne Home to draw up a memorial on the subject of agricultural epidemics; and to the Earl of Dunmore, Mr Walker of Bowland, Mr Hunter of Thurston, and Mr Ford, Hardengreen, to prepare a representation to the Privy Council, pointing out the necessity of uniformity of action of the different local authorities in Scotland.

IMPROVEMENT OF LAND IN SCOTLAND.—The following premiums, suggested by the Special Committee on the Improvement of Land in Scotland, of which the Marquis of Tweeddale is convener, were agreed to:—For approved reports, by a proprietor or tenant, on the cultivation of not less than 150 imperial acres of land of inferior quality—first premium, L.200; second, L.150. Intimation of intention to compete to be lodged by 1st November 1873. The operations to be reported on must be commenced not later than the autumn of 1873, be conducted on a farm of at least 150 acres imperial, extend over a period of not less than five or six years, and embrace a complete rotation of crops. The Society will appoint a committee, who shall determine if the land is of the class referred to. The committee shall periodically inspect the operations, and shall have power to call for any information on any point they may consider necessary. They shall not in any way interfere with the system of management pursued, nor make any suggestions, but shall take their own notes, so as to be able to check the statements made in the report. The report must detail the previous state of the land, and the system of cultivation pursued thereon, if any; the nature of the soil and subsoil; the whole operations carried on, including trenching, draining, liming, fencing, road-making, &c., during the rotation, and the cost thereof; the quantity and cost of all seed and manure applied; the produce of each crop; and the kind and quantity of live stock kept. Classified abstracts of the whole expenditure and return for each year must also be given. The Board instructed the Secretary to include the premiums in the general list for the current year.

STIRLING SHOW, 1873—*Site for Showyard.*—The Secretary reported that he was in treaty for ground for the showyard, and he was instructed to meet a committee of the Town Council of Stirling, who had offered to assist him in the matter.

Competition of Thoroughbred Stallions.—The date of competition for the premium of L.50, offered for the best thoroughbred stallion, to serve in the Stirling district during the ensuing season, was fixed to take place at Stirling on Friday the 21st of March.

INVERNESS SHOW, 1874.—A minute of meeting of Standing Committee and members of the Morayshire Farmers' Club was read, in which it was suggested that the Directors should (1) add to the prize list of the Inverness Show yearling shorthorn and cross-bred oxen; (2) that the same money premiums for fat stock should be given as at the show at Inverness in 1865; and (3) that in extra sheep a section should be added for shearling wethers of any cross-breed. The Board agreed to add to the classes of stock a section for shearling wethers of any cross, but declined to include in the list a class for yearling shorthorn and cross-bred oxen, or to give money premiums in place of medals for fat stock.

HIRING MARKETS.—The report by the special committee appointed to consider the system of engaging farm servants, and to report on the propriety of recommending the adoption of registers throughout the country, was before the Board, when the following resolutions by the committee were approved of:—1. That the system of hiring markets, as it at present prevails in the larger towns in Scotland, is very generally admitted to be productive of much evil. 2. That hiring markets in the smaller villages are, for the most part, quietly and orderly conducted. 3. That the Directors should be recommended to send a circular to all district associations in Scotland, impressing on them the necessity of using their influence to promote the formation of registers for farm servants. 4. That the landed proprietors and tenant-farmers of Scotland be called upon to exert themselves to establish a system of registers, through which to engage farm servants with strict reference to character, allowing them the privilege of another day as a holiday instead of the feeing market-day; and the committee further recommend that, in order to induce less change amongst farm servants, ample cottage accommodation should be provided on farms. It was remitted to the committee to carry out the suggestions contained in the resolutions.

COMMITTEES FOR 1873.—The Committees for the current year were arranged, and will be found at page 7 of the Premium Book, Appendix B.

MEETING OF DIRECTORS, 5TH MARCH 1873.

Present—Admiral Sir William J. Hope Johnstone, K.C.B.; Dr Balfour; Mr Curror, The Lee; Mr Ford, Hardengreen; Mr Gibson, Woolmet; Mr Gillon of Wallhouse; Mr Glennie, Fernyflatt; Mr Harvey, Whittingham Mains; Mr Hunter of Thurston; Mr Irvine of Drum; Captain Tod of Howden; Mr Walker of Bowland; Mr Seton Wightman of Courance; Professor Wilson. Professor WILSON in the chair.

Mr F. N. MENZIES reported apologies for the absence of Sir Archibald Hope of Pinkie, Bart.; Sir William Forbes of Craigievar, Bart.; Sir Henry J. Seton Steuart of Touch, Bart.; Dr Anderson; Mr Leslie Melville Cartwright, Melville House; Mr Milne Home of Wedderburn; Mr Kenneth Mackenzie, C.A.; Mr Murray of Dollerie; Mr Munro, Fairnington; Mr Swinton, Holyn Bank; and Mr Young, Keir Mains.

CHEMICAL DEPARTMENT.—In terms of a remit from the last meeting of Directors, the committee in charge of this department held a meeting on the 19th ult., when it was resolved to recommend to the Board to appoint Mr James Dewar, F.R.S.E. (who at present holds the Professorship of Chemistry in the Edinburgh Veterinary College, and is assistant to the Professor of Chemistry in the University), assistant chemist to the Society, under the following regulations:—1. That the appointment be in accordance with the rules laid down in the Society's charter. 2. That the salary shall be L.150 per annum, in addition to lecture and other fees, and also travelling expenses. 3. That he shall attend at the Society's chambers on Wednesdays from twelve to one, for such period of the year as the Directors may deem necessary. 4. That he shall reside and have his laboratory in Edinburgh. 5. That he shall reply to letters asking advice, and make analyses for members at the Society's rates. 6. That he shall, under certain regulations, give lectures in different districts. 7. That one or more lectures shall be given in a limited number of districts on the application of a local committee of members, and on payment of L.2, 2s. for each lecture, in addition to travelling expenses. If three lectures be given on consecutive days, the fee to be L.5, 5s. for the course. 8. That a series of experiments shall be carried out, under the personal superintendence of the assistant chemist, in a limited number of districts where a local committee of members will contribute two-thirds of the expenses incurred. 9. That the nature and extent of such experiments shall be from time to time determined by the Board of Directors. 10. That the assistant chemist shall superintend, under the direction of the Society's chemist, the carrying out of these experiments, and periodically inspect them. 11. That the field experiments shall be the same in the different districts contributing. 12. That the report of these experiments shall be made by the assistant chemist and furnished to the Secretary for publication on or before the 1st of February of each year. On the motion of Professor Wilson, seconded by Mr Harvey, Whittingham Mains, the appointment of Mr Dewar was confirmed, and the above regulations approved of.

CONTAGIOUS DISEASES (ANIMALS) ACT, 1869.—The subject of memorialising the Privy Council to issue such regulations as will secure uniformity of action among local authorities in Scotland having been remitted by the general meeting on the 15th of January last to the Directors, and by them referred to a special committee—consisting of the Earl of Dunmore, Mr Walker of Bowland, Mr Ford, Hardengreen, and Mr Hunter of Thurston—that committee held a meeting on the 19th ult., when they resolved to recommend that a memorial in the following terms should be adopted by the Directors:—

"Unto the Lords of Her Majesty's most Honourable Privy Council, the Memorial of the Highland and Agricultural Society of Scotland, incorporated by Royal Charter,

"Sheweth—That your memorialists, as representing the landed proprietors and tenant-farmers of Scotland, have taken a lively interest in the working of the Contagious Diseases (Animals) Act, 1869. That your memorialists have carefully considered the subject, and are of opinion that the want of a proper system of organisation, enforcing uniformity of action, is one of the causes of the great extent to which contagious disease has spread throughout the country. That at present every local authority acts according to its own views, the consequence being that the efforts of one local authority are frequently rendered useless by the counter-action of another. That such counter-action has arisen between neighbouring counties, and also between counties and burghs, from the latitude given to them by the Orders in Council. Your memorialists therefore humbly pray your Lordships to take this most important subject into consideration, and to issue such orders as may lead to a proper system of organisation and uniformity of action, and prevent orders being given by one local authority at variance with those of another."

The Board approved of the memorial, and the chairman was authorised to sign it on behalf of the Society. In transmitting the memorial, the Secretary was instructed to inform Dr Alexander Williams, the secretary of the veterinary department of the Privy Council. that, since the remit was made, the Directors are aware of the appointment of a special committee of the House of Commons to inquire into the working of the Act, and express the desire of the Board that evidence may be obtained from Scotland.

Hiring Markets.—The special committee on this subject held a meeting on the 26th ultimo, when it was suggested that the report on hiring markets, containing the queries, with a summary of the answers received, as well as the resolutions, should be inserted in the forthcoming volume of the Society's Transactions; that a number of separate copies should be thrown off and sent with a circular to the secretary of each local Agricultural Society in Scotland, along with a supply of the resolutions, for separate circulation among the members of the local Societies. The Board approved of the suggestions by the committee.

Stirling Show, 1873—*Site for Showyard.*—The Secretary stated that, as authorised at last Board meeting, he held a conference with a committee of the Town Council of Stirling in regard to the site for the general show, when the feeling was unanimous as to holding it in the King's Park. He had therefore made the necessary arrangements with Mr Dewar, the Crown tenant.—The agreement was submitted and approved of.

Agricultural and Forestry Examinations.—The examinations for the Society's agricultural certificate and diploma, and for the Society's certificates in forestry, were fixed for Tuesday and Wednesday, the 25th and 26th current, candidates being required to lodge intimation, on or before the 17th, with the Secretary, from whom further information may be obtained.

Veterinary Department.—On the motion of Captain Tod of Howden, chairman of the Veterinary Department, seconded by Mr Curror, The Lee, the Board agreed to make a grant of L.50 to the Edinburgh Veterinary College, to enable an arrangement to be made with Professor Balfour for conducting the botany class to be established in connection with the College.

Condensed Peat.—Specimens of peat prepared by Messrs Henry Clayton, Son, & Howlett, Atlas Works, Harrow Road, London, the patentees of the improved system of preparing condensed peat, were submitted; and the Secretary stated that he had suggested to these gentlemen the advisability of turning out a small machine to be worked by horse-power, which he considered would be a great boon to proprietors and farmers in localities where peat existed.

Transactions.—The Secretary reported that the Transactions were now so far advanced that he expected to begin the issue about the middle of April. The Premium Book, he hoped, would be out next week.

Papers in Competition.—On the report of the Reading Committee, a minor gold medal was awarded to Mr P. R. Latham, The Drums, Falkirk, for a report on fencing and shelter of mountain sheep-walks; and a medium silver medal to Mr John Allan, Crieffvechter, Crieff, for a report on the use of potash manures.

Trial of Grubbers.—A letter was read from Mr Munro, Fairnington, stating that the local committee on implements for the late show at Kelso had fixed the trial of grubbers for Thursday, 17th April, on the farm of Rutherford, near Kelso.

MEETING OF DIRECTORS, 2D APRIL 1873.

Present—Sir Archibald Hope of Pinkie, Bart.; Sir George Scott Douglas of Springwood Park, Bart; Sir Henry J. Seton Steuart of Touch, Bart.; Sir George Macpherson Grant of Ballindalloch. Bart.; Mr Curror, The Lee; Mr Ford, Hardengreen; Mr Gillon of Wallhouse; Mr Harvey, Whittingham Mains; Mr Hunter of Thurston; Mr Kenneth Mackenzie, C.A.; Mr Munro, Fairnington; Mr Scot Skirving, Camptoun; Mr Smollett of Bonhill; Mr David Stevenson, C.E.; Mr Swinton, Holyn Bank; Captain Tod of Howden; Mr Walker of Bowland; Professor Wilson; Mr Pettigrew Wilson of Polquhairn. Professor Wilson in the chair.

Mr F. N. Menzies reported apologies for the absence of Sir William Forbes of Craigievar, Bart.; Mr Glennie, Fernyflatt; Mr Milne Home of Wedderburn; Mr Irvine of Drum; Mr Small Keir of Kindrogan; and Mr Seton Wightman of Courance.

Contagious Diseases (Animals) Act, 1869.—A letter was read from Dr Alexander Williams, acknowledging receipt of the memorial adopted at last Board meeting, and stating, by desire of Mr Forster, that the proposal to call witnesses from Scotland would be submitted to the committee. It was suggested that the Directors should report to Mr Menzies the names of parties competent to give evidence before the committee in case he should be applied to hurriedly to send witnesses to London, which the Directors present agreed to do.

Stirling Show, 1873—*Thoroughbred Stallions.*—The report of the competition for the L.50 prize, offered by the Society for the best thoroughbred stallion, to serve this season in the district of the show, was submitted, from which it appeared that six animals had been entered, and that the judges—Mr Thomson of Charlton; Major Browne, Royal Scots Greys; and Mr Ford, Hardengreen—had awarded the premium to Mr James Drummond, Blacklaw, Dunfermline, for his stallion "Mesmer." The animal next in merit was "Nuneaton," belonging to Mr David Riddell, Kilbowie, Duntocher.

Local Committee.—The usual letters to the conveners of the counties embraced in the district connected with the show, and to the Provost of Stirling, as to the appointment of the local committee, were approved of. The numbers to be named by the different counties were arranged as follows:—Stirlingshire, 20; Dumbartonshire, 15; Clackmannanshire, 8; western division of Perthshire, 12; town of Stirling, 10.

Inverness Show, 1874.—Draft letters to the conveners of the counties connected with the Inverness Show (Inverness, Elgin, Nairn, Ross and Cromarty, Caithness, Sutherland, and Orkney, including Shetland), in regard to the auxiliary subscription, were submitted and approved of.

Agricultural Education.—At the meeting of Council on Education, held on the 26th ultimo, a certificate and diploma were granted to each of the following gentlemen:—Italo Giglioli, M.R.A.C., Cirencester; E. C. Munby, M.R.A.C., Clifton Holme, York; R. F. Juckes, Royal Agricultural College, Cirencester. At the same time a certificate was conferred on R. C. Bruce Willis, M.R.A.C., Cirencester, who is entitled to present himself next year for the further examination, in terms of the regulations, for the diploma.

Forestry Department.—Mr Peter Loney, Marchmont, Dunse, having passed for first-class certificate in forestry at the examinations on the 25th and 26th ultimo, the Board approved of the report by the examiners, and authorised the issue of the certificate.

Veterinary Department.—The annual public examinations for the Society's veterinary certificate, which are open to the students of any veterinary teacher duly recognised by Government, were approved of being held on Tuesday and Wednesday, the 15th and 16th current, the practical examination taking place on Monday the 14th. It was remitted to a committee, consisting of Captain Tod of Howden, Mr Gillon of Wallhouse, and Mr Kinloch, yr. of Gilmerton, to consider and arrange as to holding the examinations in the Society's hall.

Agricultural Epidemics.—A draft memorial to Her Majesty's Commissioners of the Board of Trade, prepared by Mr Milne Home of Wedderburn, on the subject of the diseases affecting different agricultural crops, and in particular the potato, turnip, and cereal crops, was referred to the following committee:—Professors Anderson, Balfour, and Wilson; and Messrs Walker of Bowland; Milne Home of Wedderburn; Gibson, Woolmet; Mylne, Niddrie Mains; Curror, The Lee; and David Stevenson, C.E.

Ballarat Farmers' Club.—The following letter addressed to the President and Council of the Society was read:—

"39 Lydiard Street, Ballarat, *3d January* 1873.

"Gentlemen,—A few of the gentlemen composing the Ballarat Farmers' Club were formerly members of your Society, and though removed to the antipodes they desire to continue the work, adopt your motto, and extend in this country the practice of high farming. In this endeavour the Ballarat Farmers' Club would be greatly encouraged by suggestions from your Society relative to the mode of collecting scientific and practical knowledge, and the best means to introduce the same to farm practice. A copy of your rules and a copy of your journal as a donation to the library of this club would give a most valuable stimulus and help to develop the productive resources of this country, and to increase the purchasing power of the people. For the information of your Society, it may be stated that the lands of this colony are occupied by persons from every vocation in life. They have devoted themselves exclusively to the production of corn crops, without providing means to uphold the fertility of the soil, consequently farming in Victoria is at a very low ebb, especially as sheep breeding has been separated from corn growing since the first settlement of the colony. There are under tillage one million of acres of land out of seven millions of acres purchased. There are employed upon the land sixty thousand persons. The country has a gradual ascending character from the sea to the summit of the dividing range, and in the east to the apex of the Australian Alps, then it gradually descends north to the River Murray. These variations in altitude and corresponding ranges of climate enable Victoria to produce all the economic plants and valuable farm products of Europe. To the present time unfortunately no means have been provided to educate the farmer in this most important occupation. But it is the object of this club to present to their attention the best mode of securing the most valuable products by the least expenditure of power, and to combine the highest scientific learning and research with the ordinary farm practice. To accomplish so desirable a task, the Ballarat Farmers' Club solicits the countenance and support of the Highland and Agricultural Society of Scotland. I have the honour to remain, your obedient servant,

"(Signed) Jno. Woodyatt, Secretary."

The Board agreed to send a copy of the Transactions from the commencement of the present series in 1866, and any other documents of interest.

MEETING OF DIRECTORS, 7TH MAY 1873.

Present—Professor Balfour; Mr Curror, The Lee; Mr Ford, Hardengreen; Mr Gibson, Woolmet; Mr Harvey, Whittingham Mains; Mr Milne Home of Wedderburn; Mr Hunter of Thurston; Mr Kenneth Mackenzie, C.A.; Mr Mitchell, Alloa; Mr Munro, Fairnington; Mr Smollett of Bonhill; Mr Swinton, Holyn Bank; Captain Tod of Howden; Mr Seton Wightman of Courance; Professor Wilson. Professor Wilson in the chair.

Mr F. N. Menzies reported apologies for the absence of Sir Archibald Hope of Pinkie, Bart.; Sir George Macpherson Grant of Ballindalloch, Bart.; Mr Gillon of Wallhouse; Mr Glennie, Fernyflatt; Mr Irvine of Drum; Mr Small Keir of Kindrogan; and Mr Pettigrew Wilson of Polquhairn.

Death of Mr Aitchison, Linhope.—On the motion of the Chairman, the Directors instructed the Secretary (1) to record in the minutes the deep regret with which they regard the death of Mr Aitchison, Linhope (a member of the Board), and their sense of the valuable assistance which the Society has received from him; and (2) to communicate a copy of this resolution to Mrs Aitchison, with their most sincere sympathy and condolence under so severe a bereavement.

General Meeting.—The half-yearly general meeting of the Society, for the election of members and for other business, was fixed to be held on the 25th of June, being the first Wednesday after the closing of the entries for the Stirling Show, the usual day for holding the meeting.

Stirling Show, 1873.—Communications were submitted from the clerks of supply for the counties of Stirling, Dumbarton, and Clackmannan, intimating the appointment of the usual number of gentlemen to represent these counties on the General Committee of Superintendence on the occasion of the General Show at Stirling on the 5th, 6th, 7th, and 8th of August next. Mr Menzies reported that the last day of entry was fixed for the 20th of June, when he would attend at Stirling, and would call the General Committee of Superintendence together to appoint the sub-committees.

Inverness Show, 1874.—A letter was read from Mr James Anderson, clerk of supply for Inverness-shire, sending an excerpt from a minute of a meeting of the county, held on the 30th of April, stating that it had been agreed to apply for a uniform contribution of one halfpenny in the pound on the rental of the county (but exempting the small proprietors in villages), which it is calculated will produce something over L.600. A communication was also submitted from Mr Henderson of Stemster, convener of Caithness-shire, intimating that the Commissioners of Supply, at their meeting on the 30th, had agreed to recommend a voluntary assessment at the rate of L.1, 10s. per L.1000 of county rental. This should produce L.150, and Mr Henderson states that he expects the Local Agricultural Society will contribute L.25.

Trial of Grubbers at Rutherford.—The following report by Mr Munro, Fairnington, of the trial of grubbers, which took place on the farm of Rutherford, near Kelso, on Thursday the 17th of April, was read:—"The field operated on had been ploughed with rather a wide furrow, and only six inches deep. There was a fair portion of clay in it, and it was mostly very full of quicken grass. It was very well fitted for testing the implements, and was in good condition for being cultivated. Of the six implements that were brought forward, the committee considered that, on the whole, the two-wheel machine made by Mr Brown, Edington, Chirnside, made the best work, with fewest stoppages, and at the least expenditure of horse labour; but from its not having been exhibited at the Kelso Show, they did not consider that it was entitled to compete. Perhaps the Directors might take Mr Brown's case into their favourable consideration, as his other implement, which was at Kelso, is much of the same construction; his manner of fastening the tines is very simple, and they are easily removed for repair. Excluding the above, the committee recommend the two-wheel grubber, made by Messrs Kemp, Murray, & Nicholson, Stirling. Pirie's implement, which was recommended for trial by the Inspecting Committee of the show, wrought the land exceedingly well, and did not choke very often; but, as will be seen by the annexed table, it was very heavy to draw. Colman's cultivator, exhibited by Mr Shiel, Coldstream, had to be stopped after going once round the land, as the draught was oppressive for three horses in the state that the land was in."

Implement.	Width between centres of outside tines.	Depth cultivated in inches.	Draught in cwts.
	ft. in.		
Three-wheel two-horse grubber by Mr Brown, Edington, Berwickshire, ...	3	7	5
Three-wheel three-horse do. by Messrs Kemp, Murray, & Nicholson, Stirling, ...	3	7	7
Two-wheel two-horse do. by do., ...	2 9½	7	5½
Two-wheel two-horse do. by Mr Brown, Edington, .	3	7	5
Three-wheel three-horse do. by Mr Pirie, Kinmundy, .	3	7	9

The Board resolved to award a silver medal to Messrs Kemp, Murray, & Nicholson, Stirling, and a similar one to Mr Brown, Edington; and to record their best thanks to the committee for conducting the trial.

Agricultural Education.—The two prizes of L.6 and L.4 annually voted by the Society to the Class of Agriculture in the Edinburgh University were reported to have been this year awarded to—1. Henry Erskine, Brechin; 2. David T. Mitchell, Burnton, Laurencekirk, and John Dyer, Edinburgh—equal; and that the prizes had, as usual, been taken in books.

Veterinary Department.—The report of the examinations for the Society's veterinary certificate, which took place on the 14th, 15th, and 16th ult., when twenty-six students passed, and eight medals were awarded by the Society, was laid on the table.

Improved Cattle Trucks.—Two models of cattle trucks sent by Mr Andrew Milne, Southhill of Craigo, Montrose, were exhibited to the Directors, and, after minute inspection, they highly approved of No. 1 model, which they considered met the requirements of the cattle trade, and with a few slight alterations, such as heightening the roof and giving more ventilation, they considered would greatly tend to the comfort and health of the animals conveyed by rail. The truck is so constructed that food and water can easily be given to the animals in transit. The Board expressed a hope that the railway companies would see the necessity of adopting trucks built on this principle at a very early date.

Contagious Diseases of Animals.—A letter was submitted from Mr Plummer of Sunderland Hall, addressed to the Secretary, in regard to the number of dogs now infesting the country, which it is strongly felt has much to do with the spread of disease. It was stated that there is now power given to local authorities to order the destruction of dogs, but that this has not, and cannot very well be, acted upon. Mr Plummer adds—"For other reasons it is most desirable that the dogs should be largely reduced in numbers; and if this is not done in times like the present (when we are free from disease), what chance have we when an outbreak takes place? I do not think the foot-and-mouth disease ever could have touched my home farm if it had not come to me through this channel; and all attempts at 'isolation' are a mere farce so long as the 5s. licence exists, which encourages the drivers of bakers' and butchers' carts, &c.,

to travel about with a hungry pack at their heels fresh from a town full of disease. The tax should be either L.5 a dog, or full power given to destroy every cur that leaves the turnpike road." Mr Plummer concluded by stating that one of the principal cattle and sheep farmers in his county told him only a few days ago that stock farming suffered most severely from the dog nuisance.

TRANSACTIONS.—The Secretary, in laying on the table Vol. 5 of the Fourth Series of the Society's Transactions, mentioned that the issue to members had been commenced on the 21st of April, and that it would be completed in the course of the present week.

MEETING OF DIRECTORS, 4TH JUNE 1873.

Present—Most Noble the Marquis of Lothian, Vice-President; Sir George Macpherson Grant of Ballindalloch, Bart.; Admiral Sir William J. Hope Johnstone, K.C.B.; Mr Curror, The Lee; Captain Maitland Dougall of Scotscraig; Mr Ford, Hardengreen; Mr Harvey, Whittingham Mains; Mr Hunter of Thurston; Mr Irvine of Drum; Mr Johnstone of Alva; Mr Small Keir of Kindrogan; Mr Eliott Lockhart of Borthwickbrae; Mr Kenneth Mackenzie, C.A.; Mr Mitchell, Alloa; Mr Scot Skirving, Camptoun; Mr David Stevenson, C.E.; Mr Campbell Swinton of Kimmerghame; Mr Swinton, Holyn Bank; Captain Tod of Howden; Mr Walker of Bowland; Mr Pettigrew Wilson of Polquhairn; Mr Young, Keir Mains. Captain MAITLAND DOUGALL of Scotscraig in the chair.

Mr F. N. MENZIES reported apologies for the absence of Sir William Forbes of Craigievar, Bart.; Sir Henry J. Seton Steuart of Touch, Bart.; Mr Gillon of Wallhouse; Mr Glennie, Fernyflatt; Mr Munro, Fairnington; Mr Seton Wightman of Courance; and Professor Wilson.

GENERAL MEETING.—The programme of business to be brought before the half-yearly general meeting of the Society on the 25th was arranged as follows:—Election of Members; Stirling Show Arrangements; Report on Chemical Department, and appointment of Mr James Dewar as assistant chemist; Agricultural Education; Forestry Department; Veterinary Department; Transactions for 1873; Prize Essays on Humanity to Animals.

NEW MEMBERS.—The list of candidates for election on the 25th curt. was submitted; and the Secretary intimated that additional names could be received up to the morning of the meeting.

STIRLING SHOW—*Hotel Accommodation.*—The head-quarters of the Society were fixed to be at the Golden Lion Hotel, and an agreement with Mr Campbell was submitted and accepted by the Board.

Refreshments in Yard.—The Secretary reported that the three refreshment rooms were let to Mr Drysdale, St Andrew Street, Edinburgh; Mr Henry Lee, Hope Street, Edinburgh; and Mr Campbell, Royal Hotel, Stirling.

President's Dinner.—The Board approved of the President's dinner being held in the Corn Exchange Hall on the evening of Wednesday, 6th August; and the Secretary was instructed to arrange with a contractor.

Closing of the Entries.—The Secretary stated that as Friday the 20th curt. was the last day for lodging certificates, he would attend at the Golden Lion Hotel, Stirling, on that day to receive entries and to close the list.

MEETING OF DIRECTORS, 25TH JUNE 1873.

Present—Sir William Forbes, Bart.; Dr Anderson; Dr Balfour; Mr Curror, The Lee; Captain Maitland Dougall of Scotscraig, R.N.; Mr Ford, Hardengreen; Mr Harvey, Whittingham Mains; Mr Milne Home of Wedderburn; Mr Hunter of Thurston; Mr Irvine of Drum; Mr Mackenzie of Portmore; Mr Kenneth Mackenzie, C.A.; Mr Mitchell, Alloa; Mr Munro, Fairnington; Mr Stevenson, C.E.; Mr Swinton, Holyn Bank; Mr Walker of Bowland; Mr Pettigrew Wilson of Polquhairn. Captain MAITLAND DOUGALL in the chair.

Mr F. N. MENZIES reported apologies for the absence of Sir George Macpherson Grant; Admiral Sir William J. Hope Johnstone, K.C.B.; and Mr Small Keir of Kindrogan.

The business had principally reference to the subjects to be brought before the general meeting of this date.

MEETING OF DIRECTORS, 2D JULY 1873.

Present—Sir George Macpherson Grant of Ballindalloch, Bart.; Professor Balfour; Mr Ford, Hardengreen; Mr Gibson, Woolmet; Mr Hunter of Thurston; Mr Irvine of Drum; Mr Kenneth Mackenzie, C.A.; Mr Mitchell, Alloa; Captain Tod of Howden; Mr Seton Wightman of Courance; Professor Wilson; Mr Pettigrew Wilson of Polquhairn. Professor WILSON in the chair.

Mr F. N. MENZIES reported apologies for the absence of Sir Henry J. Seton Steuart of Allanton, Bart.; Mr Glennie, Fernyflatt; Mr Milne Home of Wedderburn; Mr Small Keir of Kindrogan; and Mr Young, Keir Mains.

THE LATE LORD MARJORIBANKS.—Al etter was read from Mr Askew of Pallinsburn, conveying Lady Marjoribanks' warmest thanks for the compliment paid to the memory of her lamented husband by the General Meeting of the Society on the 25th of June.

VETERINARY EXAMINATIONS.—The summer examination of candidates for the Society's veterinary certificate, which is open to the students of any veterinary college duly recognised by Government, was fixed to take place in the Society's hall, 3 George IV. Bridge, on Tuesday and Wednesday, the 15th and 16th current, candidates being required to lodge their names with the Secretary on or before Monday the 14th current.

The other business before the meeting had reference principally to the appointment of judges and other matters connected with the Stirling Show.

MEETING OF DIRECTORS, 5TH NOVEMBER 1873.

Present—Sir George Macpherson Grant of Ballindalloch, Bart.; Admiral Sir William J. Hope Johnstone, K.C.B.; Professor Balfour; Mr Curror, The Lee; Mr Graham Binny, W.S.; Mr Ford, Hardengreen; Mr Gillon of Wallhouse; Mr Glennie, Fernyflatt; Mr Harvey, Whittingham Mains; Mr Hunter of Thurston; Mr Irvine of Drum; Mr Small Keir of Kindrogan; Mr Kenneth Mackenzie, C.A.; Mr Mitchell, Alloa; Mr Munro, Fairnington; Mr Murray of Dollerie; Mr David Stevenson, C.E.; Captain Tod of Howden; Professor Wilson. Professor WILSON in the chair.

Mr F. N. MENZIES reported apologies for the absence of Sir William Forbes of Craigievar, Bart.; Sir Henry J. Seton Steuart of Allanton, Bart.; Mr Milne Home of Wedderburn; Mr Smollett of Bonhill; Mr Campbell Swinton of Kimmerghame; Mr Swinton, Holyn Bank; Mr Walker of Bowland; Mr Seton Wightman of Courance; and Mr Young, Keir Mains.

AGRICULTURAL EPIDEMICS.—The following letter from the Board of Trade in reference to the memorial adopted at the last general meeting was read:—

"OFFICE OF COMMITTEE OF PRIVY COUNCIL FOR TRADE,
14th August 1873.

"SIR,—I am directed by the Lords of the Committee of Privy Council for Trade to acknowledge the receipt of a memorial, signed by the Marquis of Lothian as chairman of the Highland and Agricultural Society of Scotland, praying for the appointment of a commission to inquire into the cause of the potato disease. In reply, I am to state that the Board of Trade, while not contesting the value under certain circumstances of inquiries of this nature instituted by Government, are unable, after obtaining the best advice in their power, to see that a Government inquiry would add to the knowledge now possessed on the subject of the potato disease. I am to add that it is understood by this Board that the Royal Agricultural Society is about to obtain essays on the subject, which will, no doubt, be available to the public.—I am, &c.,

"(Signed) W. R. MALCOLM.

"The Secretary, Highland and Agricultural
Society of Scotland."

The letter, as well as a communication from Mr Milne Home on the subject, was remitted for the consideration and report to the Special Committee on the subject of agricultural epidemics.

KELSO SHOW 1872.—The following transferences of premiums were reported:—*Shorthorn Cows.*—The cow "Daisy," belonging to Mr Browne, Bank House, Acklington, which won the third prize, having failed to produce a calf within four months after the show, in terms of the general regulations, the premium has been transferred to Mr W. A. Mitchell, Auchnagathle, Whitehouse, Aberdeen, for his heifer "Lady Forbes." *Galloway Cows.*—The cow "Maxwell," belonging to Mr Cunningham, Tarbreoch, Dalbeattie, which carried the first prize, not having proved in calf, the premium has been transferred to said Mr Cunningham for his cow "Jane," which stood second, and the second and third prizes have respectively been transferred to the Duke of Buccleuch for his cow "Handsome," and to Mr Biggar, Chapelton, Dalbeattie, for his cow "Claret 2d."

STIRLING SHOW, 1873.—The Directors approved of the awards made on the occasion of the late show at Stirling; and the Chairman was authorised to sign orders for the money premiums, which the Secretary was instructed to issue along with the medals.

INVERNESS SHOW, 1874.—It was remitted to the Committee on General Shows to consider and revise the increased scale of premiums as formerly arranged, and adjust the regulations for the show to be held at Inverness in 1874.

PROPOSED SHOW AT GLASGOW IN 1875.—Requisitions addressed to the Directors to hold the General Show at Glasgow in 1875, for the district comprising the counties of Lanark, Ayr, Argyll, Renfrew, and Bute, were submitted, and it was remitted to the General Show Committee to prepare the classes of stock for which premiums should be offered.

MEETING AT ABERDEEN.—The following correspondence was read to the Board:—

Mr Menzies to the Marquis of Huntly.

"3 GEORGE IV. BRIDGE, EDINBURGH,
22d October 1873.

"Dear Lord Huntly,—I am glad to say I am now able to send you answers to the queries you forwarded to me. I have given you full details, as I am sure the Directors would wish you to be in possession of all the information you wish. I have put a note at the foot of the answers to two of the queries, as I think it right you should know that it is not the want of offering premiums which has left us so scant of awards. I also think it right to inform you that before any agitation took place in Aberdeenshire, the subject of increasing our prizes was considered, and that likely when the General and District Show Committees meet next month a large addition will be made to both the number and the value of the premiums.—I am yours truly."

Marquis of Huntly to Mr Menzies.

"ABOYNE CASTLE, ABERDEENSHIRE,
25th October 1873.

"Dear Mr Menzies,—I have to thank you very much for the information you gave me, and the answers to the questions which I sent you with regard to the Highland Society. They were of service to me at the meeting yesterday, and I only hope that the resolutions passed at the meeting will assist the Directors in carrying out the objects of the Society.—I am yours truly."

Mr Menzies to the Marquis of Huntly.

"3 GEORGE IV. BRIDGE, EDINBURGH,
28th October 1873.

"Dear Lord Huntly,—I see from a report in the 'Aberdeen Free Press' of a meeting of members of this Society in the north of Scotland, held at Aberdeen, that, in answer to Sir James Elphinstone, you state 'that I had been invited to attend the meeting.' As no invitation was ever sent to me, and as the advertisement invited members in the north of Scotland *only*, there must be some mistake, and I will be greatly obliged by your explaining to me the grounds on which you made that statement. The impression conveyed by your answer to Sir James is that I had been specially invited to the meeting, and had neither attended nor sent an excuse. I feel sure you will not allow me to appear to the public to have been guilty of such great discourtesy, and I trust that you can send me an explanation that I may send to the newspapers.—I am yours truly."

Marquis of Huntly to Mr Menzies.

"ABOYNE CASTLE, ABERDEENSHIRE,
30th October 1873.

"Dear Mr Menzies,—Your letter of the 28th reached me last night. As near as I can recollect, what occurred at the meeting of the members of the Highland and Agricultural Society with reference to you was as follows:—'Sir James Elphinstone regretted that you were not present, as you might be able to clear up certain points on which there was a difference of opinion, and was sorry that intimation of the meeting had not been sent you. As chairman, I was bound to inform Sir James that notice of the meeting, together with a copy of the resolutions to be moved, had been sent to you. I do not know whether Mr Yeats formally invited you, but I certainly thought that the mode in which the notice was sent you was in the form of an invitation to be present, if you so desired. I certainly never thought for a moment that you were guilty of any discourtesy, and only regret that we had not the pleasure and advantage of your presence at the meeting.—I am yours truly.

"P.S.—You may make what use of this letter that you think proper."

The letter referred to above from Mr Yeats, sending six copies of the resolutions, is in the following terms:—

"ABERDEEN, *20th October* 1873.

"Dear Sir,—In case you may not have seen the advertisement in the newspapers, I beg to enclose a few copies of the resolutions which are to be submitted to a meeting of the members residing in the northern districts on Friday next.—I am yours faithfully, "ALEX. YEATS."

"F. N. Menzies, Esq."

Mr Menzies to the Marquis of Huntly.

"3 GEORGE IV. BRIDGE, EDINBURGH,
"*31st October* 1873.

"Dear Lord Huntly.—The 'Aberdeen Free Press' distinctly reports that you stated that I had been invited; and certainly the circulars sent me did not even give me an excuse for going, as they were addressed to members in the north of Scotland. I have a meeting of Directors on Wednesday next, and will lay the matter before them, and be guided by their advice. I must say I feel that I have not been well treated in the matter.—I am yours truly."

Marquis of Huntly to Mr Menzies.

"ABOYNE CASTLE, ABERDEENSHIRE,
"*3d November* 1873.

"Dear Mr Menzies,—I am sorry to see by your letter of the 31st ult. that you think you have not been well treated as regards the late meeting of members of the Highland Society at Aberdeen. If you wish our correspondence and an explanation from yourself to appear in the newspapers, you may certainly send it. I am sorry that a mistake occurred in the matter; but I must say that I fail to see the force of your argument that the circular was only addressed to members of the Highland Society in the north of Scotland, as your being the leading official of the Society would surely warrant your attending a meeting regarding the Society whether that meeting be held in the south or north of Scotland.—I am yours truly."

The Directors approved of the conduct of the Secretary in the correspondence which has taken place between the Marquis of Huntly and himself in reference to the meeting at Aberdeen on the 24th October. The Directors considered that no part of the proceedings could be construed into an invitation to the Secretary to be present.

INTERNATIONAL EXHIBITION AT BREMEN.—The Secretary submitted a copy of the programme of an International Agricultural Exhibition, to be held at Bremen, from the 13th to the 21st of June next, when prizes to the amount of about L.5000 will be awarded. All communications are to be addressed to the office of the International Agricultural Exhibition, Bremen; but the Secretary stated that the programme could be seen on application to him at the Society's office, No. 3 George IV. Bridge.

VETERINARY DEPARTMENT.—*Examination of Students.*—The Secretary reported that the first or preliminary examination of students for the Society's veterinary certificate, under the new regulations, took place on the 15th and 16th July, when twenty-six students presented themselves, and only one failed to pass.

Veterinary Teaching in Scotland.—The Secretary reported that he had received a circular from Mr Harris, Town-Clerk, stating that he was directed by the Lord Provost to send copy of a letter from the late Secretary of the Society to the Secretary of State, dated 7th July 1858, and adding that the reasons urged in that communication against the establishment of a new Veterinary College in Edinburgh that year applied with undiminished force to the application which has now been made with a similar object. Being aware that the said letter had been cancelled by the following resolutions moved by Professor Syme, and carried at the adjourned general meeting of the Society held on 2d February 1859, he considered it his duty to bring the subject before the Board:—"That the teaching of veterinary surgery in Scotland should not be restricted to one school, since advantage may be expected from competition in this no less than in other departments of education." And that at a meeting held on the 9th February 1859, the following resolution was adopted:—"That a copy of the resolution passed at last adjourned meeting relative to veterinary surgery be transmitted to the Secretary of State for the Home Department." Mr Menzies was instructed to send a copy of the above two resolutions to the Dick Trustees, and to state that the Directors consider they should have been consulted before the late Secretary's letter was circulated.

CHAIR OF CELTIC LANGUAGES.—A letter from the Rev. Professor Macgregor, and relative statement, in favour of the institution of a chair of Celtic languages and literature in the University of Edinburgh, were submitted and postponed to the Directors' meeting in December.

PERFORATED DRAIN PIPE.—The following description of a perforated drain pipe, by Colonel William Ross King of Tertowie, Aberdeenshire, was referred to the Society's Machinery Committee, who stated that it would be necessary to have a longer trial of the pipe than the short time it has been in use before reporting on its merits:—"This simple invention consists in having the common 3-inch or 1½-inch clay drain pipe, perforated on its upper half with three longitudinal parallel lines of holes about one-sixteenth of an inch in diameter, with a space of one inch between each row, as also between each hole. These pipes are of course not intended, nor are they suitable, for any situation in which they would be liable to become choked either by friable soil, or sand, or by the roots of trees or plants. They are to be used only in stiff clay, which is not likely to stop the holes, clear of woods or trees, and at a sufficient depth below the surface to avoid the roots of plants, which, however, in such soil do not usually penetrate so far down as in light land. The object is to obtain a more rapid percolation of water than takes place in retentive clays with the ordinary drain pipe. In such ground the water works very slowly through the stiff-holding medium into the pipe joints, and what filters with equal sluggishness through the substance of the upper portion of the pipe into its channel is perhaps as likely again to find its way through the lower side. But if the rapidity of the former process can be artificially increased, the water is also more likely to form a stream and run off by the channel; and that the moisture is by the perforation of the pipes more quickly and effectually withdrawn from the superincumbent soil I have found by actual trial. At the close of last year I laid down several parallel lines of these pipes, 1½-inch in diameter, in a grass field of stiff clay land, at a depth of three feet below the surface. Though previously drained, this field was always wet, and in rainy weather the water stood for days together, and often from one shower till the next, in the furrows, in which the grass was eventually killed. Since these pipes have been laid down, now about ten months, during which the rainfall has been above the average, no water has been found standing on the surface, and the land appears thoroughly drained; while there is observable a larger amount of water running from the outlets of these pipes than from the adjacent drains in the same field which are laid with the ordinary pipes. Similarly, on wet clayey carriage-drives and walks in pleasure-grounds, I have, by laying a line of the perforated pipes along their centre, at a depth of 12 inches to 18 inches, obtained a constant dry surface where ordinary means had previously failed. I am therefore of opinion that for the purposes and place I have specified, my invention would meet with the approval of a committee of the Highland and Agricultural Society in the event of its being brought before them. I may add that the cost of the perforated pipes made for me by the Seaton Brick Work Co., Aberdeen, was 2s. 6d. per thousand above that of the common drain pipes, and I believe that they could be made for less."

STEAM CULTIVATION.—A letter was read from Mr James Howard, M.P., stating that he had found a good deal of interest springing up in Scotland in reference to steam ploughing; that many tenants who want to possess their own, and who will not think of two engines, would like to see a public trial of the various apparatus—not a competitive one; and offering to send two or three sets, if the Society would inaugurate such a trial next spring or summer. The letter was favourably entertained, and remitted to the Special Committee on Steam Cultivation, Mr Glennie, Fernyflatt, being added to the committee.

MISCELLANEOUS REMITS.—It was remitted to the Committee on Office-bearers to suggest the list for 1874; to the Committees on District Shows and on Cottages to revise the awards for 1873, and consider the applications which have been lodged for 1874; and to the Committees on Premiums for Essays and Reports to read and report on the papers lodged in 1873, and to revise the list for 1874.

MEETING OF DIRECTORS, 3D DECEMBER 1873.

Present—Sir Wm. Stirling-Maxwell of Polloc, Bart.; Sir G. Graham Montgomery of Stanhope, Bart., M.P.; Sir George Macpherson Grant of Ballindalloch, Bart.; Admiral Sir Wm. J. Hope Johnstone, K.C.B.; Mr Curror, The Lee; Mr Ford, Hardengreen; Mr Gillon of Wallhouse; Mr Harvey, Whittingham Mains; Mr Milne Home of Wedderburn; Mr Hunter of Thurston; Mr Maxwell Inglis of Loganbank; Mr Irvine of Drum; Mr Small Keir of Kindrogan; Mr Mackenzie of Dolphinton; Mr Kenneth Mackenzie, C.A.; Mr Mitchell, Alloa; Mr Munro, Fairnington; Mr David Stevenson, C.E.; Mr Campbell Swinton of Kimmerghame; Mr Swinton, Holyn Bank; Captai

Tod of Howden; Mr Seton Wightman of Courance; Mr Pettigrew Wilson of Polquhairn. Mr MITCHELL in the chair.

Mr F. N. MENZIES reported apologies for the absence of Sir Henry J. Seton Steuart of Allanton, Bart.; Professor Balfour; Mr Glennie, Fernyflatt; Mr Walker of Bowland; Professor Wilson; and Mr Young, Keir Mains.

GENERAL MEETING.—The anniversary general meeting of the Society was fixed for the 21st of January 1874, being the third Wednesday of the month, and the usual day for holding the meeting.

FINANCE.—The Secretary, in submitting a statement of the funds at the close of the financial year on the 29th ult., reported that the books and vouchers had been placed in the hands of the auditor, Mr Kenneth Mackenzie, C.A.

OFFICE-BEARERS FOR 1874.—The report by the Committee on Office-bearers for 1874 was given in, and the Secretary was instructed to communicate with the noblemen and gentlemen suggested to fill the vacancies which occur in January next before publishing their names.

GENERAL SHOWS—*Inverness Show*, 1874.—At the last meeting of the Board, it was remitted to the Committee on General Shows to consider and revise the increased scale of premiums, as formerly arranged. The committee held meetings on the 19th November and 2d December, and have suggested premiums to the amount of L.2022, being an increase over what was offered at Inverness in 1865 of L.722, and about L160, 11s. more than what was offered at Stirling this year. The list was approved of, and will be submitted to a meeting of members to be held in the Caledonian Hotel, Inverness, on Friday the 19th current.

Glasgow Show, 1875.—The classes for the proposed show at Glasgow in 1875, as suggested by the Committee on General Shows, was submitted to the Board previous to being laid before a meeting of members to be held in the Queen's Hotel, Glasgow, on Wednesday the 10th current.

DISTRICT SHOWS.—The Committee in charge of the District Shows held a meeting on the 26th of November, when it was reported that the Society's premiums and medals had been in operation in 314 districts of Scotland during the past year. The committee, taking into consideration the suggestion made at the general meeting in January last, by Sir Thomas Gladstone, that the grants to local shows should be extended, recommended that for 1874 the number of cattle districts should be increased from eight to ten; of the districts for horse premiums from four to six; and of sheep districts from eight to ten, adding a medium silver medal to the first prize, and giving a money premium, in place of a minor silver medal, as a third prize. This, with some additional districts for medals, will make the amount to be offered about L.1187, or nearly L.350 in excess of what it was in 1873. The report was approved of.

COTTAGE COMPETITIONS.—The Committee on Cottages held its meeting on the 26th of November, when it was reported that the Society's money premiums and medals had been offered in forty-six parishes, and that reports had been received from upwards of thirty. A number of new applications were added to the list for 1875, making the sum to be offered upwards of L.150, being an increase on the sum offered this year. The report was adopted.

STIRLING SHOW, 1873.—*Trial of Reapers.*—The Board, on a report by the Local Committee at Stirling, awarded a medium gold medal to Messrs J. & F. Howard, Bedford, for their European reaper; a minor gold medal to Messrs Samuelson & Co., Banbury, for their royal self-raking reaper; and a similar medal to Mr W. A. Wood, London, for his combined reaper and mower.

Trial of Potato Diggers.—The Local Committee having selected three potato diggers invented by Mr Corbett, and made by Messrs Corbett & Peele, Perseverance Ironworks, Shrewsbury, and exhibited by Messrs A. & J. Main, Edinburgh and Glasgow; Messrs Kemp, Murray, & Nicholson, Stirling; and Mr James P. Cathcart, Ayr, the Board awarded the Society's medium gold medal to Messrs Corbett & Peele.

Trial of Self-Delivery Reapers.—On a report by the Local Committee, the Directors awarded a medium gold medal to Messrs J. & F. Howard, Bedford, for their international reaper; a minor gold medal to Messrs Samuelson & Co., Banbury, for their royal self-raking reaper; and a silver medal to Mr Walter A. Wood, London, for his champion reaper; a silver medal to Messrs J. Bisset & Sons, Blairgowrie, and a medium silver medal to Messrs James D. Allan & Sons, Culthill, Dunkeld, for their back delivery machines.

NEW VETERINARY COLLEGE.—A letter was submitted from Messrs Macgregor & Ross, S.S.C., sending copy of the warrant for the affiliation of the new Veterinary College of Edinburgh with the Royal College of Veterinary Surgeons.

INQUIRY INTO THE POTATO DISEASE.—The special committee on this subject having considered the memorial to the Board of Trade and their reply, recommended that no further proceedings in the matter should take place until the result of the premium offered by the President of the English Society was made known, which was approved of.

SPECIAL MEETING OF DIRECTORS, 17TH DECEMBER 1873.

Present—Mr Curror, The Lee; Mr Ford, Hardengreen; Mr Gibson, Woolmet; Mr Hunter of Thurston; Mr Irvine of Drum; Mr George Auldjo Jamieson, C.A.; Mr Mackenzie of Dolphinton; Mr Kenneth Mackenzie, C.A.; Mr Mitchell, Alloa; Mr Murray of Dollerie; Mr David Stevenson, C.E.; Mr Swinton, Holyn Bank; Captain Tod of Howden, Professor Wilson; Mr Pettigrew Wilson of Polquhairn. Professor WILSON in the chair.

Mr F. N. MENZIES reported apologies for the absence of Sir William Stirling Maxwell, Bart.; the Right Hon. Sir Wm. Gibson-Craig, Bart.; Admiral Sir Wm. J. Hope Johnstone, K.C.B.; Sir Geo. Macpherson Grant, Bart.; Mr Scot Skirving, Camptoun; Mr Smollett of Bonhill; Mr Campbell Swinton of Kimmerghame; and Mr Seton Wightman of Courance.

The business before the meeting had reference chiefly to the purchase of a site for a new hall for the Society.

MEETING OF DIRECTORS, 7TH JANUARY 1874.

Present—The Most Noble the Marquis of Lothian, Vice-President; the Right Hon. Sir William Gibson-Craig of Riccarton, Bart.; Sir Archibald Hope of Pinkie, Bart.; Sir William Stirling Maxwell of Keir, Bart.; Sir George Macpherson Grant of Ballindalloch, Bart.; Professor Balfour; Mr Curror, The Lee; Mr Ford, Hardengreen; Mr Gillon of Wallhouse; Mr Harvey, Whittingham Mains; Mr Milne Home of Wedderburn; Mr Hunter of Thurston; Mr George Auldjo Jamieson, C.A.; Mr Small Keir of Kindrogan; Mr Ord Mackenzie of Dolphinton: Mr Kenneth Mackenzie, C.A.; Mr Mitchell, Alloa; Mr Scot Skirving, Camptoun; Mr David Stevenson, C.E.; Mr Campbell Swinton of Kimmerghame; Captain Tod of Howden; Mr Seton Wightman of Courance; Professor Wilson; Mr Pettigrew Wilson of Polquhairn. Professor WILSON in the chair.

Mr F. N. MENZIES reported apologies for the absence of Sir Wm. Forbes of Craigievar, Bart.; Sir Henry J. Seton Steuart of Touch, Bart.; Mr Glennie, Fernyflatt; Mr Irvine of Drum; Mr Murray of Dollerie; Mr Swinton, Holyn Bank; and Mr Walker of Bowland.

THE LATE SIR JAMES COLQUHOUN AND THE LATE MR CHARLES LAWSON.—The following resolutions were unanimously agreed to:—"That the Directors of the Highland and Agricultural Society of Scotland desire to express their deep regret at the loss which the Society has sustained by the death of Sir James Colquhoun of Luss, Bart., and their sense of the cordial assistance rendered by him as an Extraordinary Director. That the death of Mr Charles Lawson, late of Borthwick Hall, having been communicated to the Directors, they feel it most justly due to his memory to express the deep sense entertained by the Society of the great zeal, assiduity, and interest uniformly evinced by Mr Lawson during the long period of his connection with the Society as Seedsman, Conservator of the Museum, and latterly as a Director of the Society; and to express the great regret at the loss which the Society has sustained by his death."

GENERAL MEETING.—The programme of business to be brought before the anniversary general meeting of the Society on Wednesday the 21st current was arranged as follows:—Congratulatory addresses on the marriage of the Duke of Edinburgh; election of members; election of office-bearers; proposed alteration on Bye-law No. 5; accounts of the Society for 1872–73; accounts of the Argyll Naval Fund for 1872–73; thanks to be voted to Local Committee, &c., of the late Show at Stirling; arrangements for the Inverness Show in 1874; requisition from Glasgow district for Show in 1875; district competitions; cottage competitions; chemical department; veterinary department; agricultural reports; forestry department; contents of vol. vi. of the Society's Transactions; proposed new hall; epidemics in stock and crops; Ordnance Survey of Scotland; steam cultivation.

OFFICE-BEARERS FOR 1874.—The following are the names of the noblemen and gentlemen to be proposed by the Directors at the general meeting on the 21st, to fill the vacancies in the list of office-bearers:—*Vice-Presidents*—The Earl of Seafield and the Hon. the Master of Lovat. *Ordinary Directors*—George Brown, Westertown. Fochabers; John Dove, Crosshall, Coldstream; H. D. Erskine of Cardross, Stirling; Robert Hutchison of Carlowrie, Kirkliston; Colonel Thomas Innes of Learney, Torphins; Bryden Monteith, Liberton Tower Mains, Liberton; Robert Stewart of Inglistou, Ratho; and Robert Wilson, Durn, Perth. *Extraordinary Directors*—Sir Archibald Dunbar of Northfield, Bart.; Sir Kenneth S. Mackenzie of Gairloch, Bart.; Alexander Henderson of Stemster; George Loch of Embo; and Colonel William Fraser Tytler of Aldourie.

New Members.—The list of candidates for admission as members at the general meeting was submitted; and the Secretary stated that additional names could be received up to the morning of the 21st.

Finance.—Abstracts of the accounts were submitted and signed in terms of the bye-laws by two members of the Finance Committee and by the Auditor.

Inverness Show, 1874.—The report of the meeting of members, held at Inverness on the 19th December, was submitted, from which it appeared that the premium list and regulations for the General Show, to be held at Inverness from the 28th to the 31st of July, had been unanimously approved of, and that the L.50 prize for the best thorough-bred stallion was fixed for Friday the 20th of March.

Proposed Show at Glasgow in 1875.—The Secretary reported having attended a meeting at Glasgow on the 10th December, when the classes of stock for the proposed show at Glasgow in 1875 had been agreed to, subject to the following suggestions:—1. That the competition of thorough-bred stallions should be held in February 1875, instead of March; and 2. That that there should be special prizes for jumping, and that all horses entered for these prizes should be bound to leap in the ring.

Essays and Reports.—Various awards were made for reports lodged in competition both in the agricultural and forestry departments, and the names of the successful competitors will be announced at the general meeting. Several new subjects were added to the list for 1874 in place of those deleted.

Veterinary Department.—A meeting of the committee in charge of this department was held on the 17th December, when various suggestions were made, which will be submitted to the general meeting.

Steam Cultivation.—The remit contained in the Directors' minute of 5th November was brought before a meeting of the Special Committee on Steam Cultivation on the 17th of December, when the committee resolved to report—(1) That an exhibition of steam cultivators should be held under the auspices of the Society, but as autumn is considered a more suitable time than spring, and as the present season is too far advanced, the committee recommend that the exhibition should take place early in autumn 1874; (2) that the exhibition shall not be competitive, but that each exhibitor shall have an opportunity of showing the full working powers of his apparatus; (3) that the exhibition shall be held in the vicinity of Edinburgh; (4) that the Society shall pay all working expenses at the exhibition; (5) that the Society shall present a gold medal to each exhibitor; and (6) that a descriptive report of the various systems represented shall be drawn up for publication in the Society's Transactions. The report was approved of, and it was remitted to the committee to make the necessary arrangements for the proposed exhibition in autumn next. A proposal by Mr Glennie, Fernyflatt, to offer a premium to be competed for in the season 1874-75 by the owners or companies owning steam-cultivating machinery, was referred to the Steam Cultivation Committee.

MEETING OF DIRECTORS, 21st JANUARY 1874.

Present—The Duke of Buccleuch; The Marquis of Lothian; Sir Archibald Hope, Bart.; Sir William Stirling Maxwell, Bart.; Sir William Forbes, Bart.; Admiral Sir Wm. J. Hope Johnstone, K.C.B.; Professor Balfour; Mr Graham Binny, W.S.; Mr Curror, The Lee; Mr Ford, Hardengreen; Mr Gibson, Woolmet; Mr Glennie, Fernyflatt; the Rev. Dr Grant; Mr Harvey, Whittingham Mains; Mr Milne Home of Wedderburn; Mr Irvine of Drum; Mr George Auldjo Jamieson, C.A.; Mr Small Keir of Kindrogan; Mr Mackenzie of Portmore; Mr Mackenzie of Dolphinton; Mr Kenneth Mackenzie, C.A.; Mr Mitchell, Alloa; Mr Murray of Dollerie; Mr Munro, Fairnington; Mr Scot Skirving, Camptoun; Mr David Stevenson, C.E.; Mr Swinton, Holyn Bank; Captain Tod of Howden; Mr Seton Wightman of Courance; Professor Wilson; Mr Pettigrew Wilson of Polquhairn. Professor Wilson, and afterwards the Marquis of Lothian, in the chair.

Apologies were reported for the absence of the Earl of Dunmore; Sir George Macpherson Grant, Bart.; Sir Henry J. Seton Steuart, Bart.; and Mr Eliott Lockhart of Borthwickbrae.

The business had reference chiefly to the subjects to be brought before the general meeting of this date, and to receive a deputation from a meeting of members at Aberdeen.

PROCEEDINGS AT GENERAL MEETINGS.

GENERAL MEETING, 25TH JUNE 1873.

The Marquis of LOTHIAN, Vice-President, in the chair.

The noble CHAIRMAN said, that before commencing the business of the meeting, he thought it right that he should call attention to the loss which the Society had sustained since the last general meeting by the death of Lord Marjoribanks. He need not say much about Lord Marjoribanks, because, wherever he was known in the south of Scotland, the name of David Robertson of Ladykirk had only to be mentioned to command respect as that of an honest, kindly, and hard-working country gentleman. He thought that they should not allow an opportunity to pass such as that without conveying to Lady Marjoribanks their sense of the loss which the Society had sustained. He therefore proposed that the Secretary be requested to draw up a letter of condolence. David Robertson, or rather Lord Marjoribanks, had taken great interest in the Highland Society, perhaps not so much during late as former years. He had done much to forward the Society's show in Berwick in 1854, and he was an extraordinary director for the Kelso Show, in which he took great interest. He thought that it was only due to themselves that they should forward some expression of their sense of the loss they had sustained.

The motion was unanimously agreed to.

NEW MEMBERS.—195 gentlemen were balloted for and admitted as members.

The noble CHAIRMAN said he thought the Society should be congratulated on the large number of new members. In fact, if the Secretary got such a long list to read at each meeting, it would throw obstacles in the way of getting a Secretary.

A ballot then took place for the election of the following gentlemen, who hold the diploma in agriculture of the Society, when they were all admitted as life members of the Society in terms of the new bye-laws;—1. Jacob Wilson, Woodhorn Manor, Morpeth; 2. John Milne, Mains of Laithers, Turriff; 3. William Henry Eley, Islingham, Frindsbury, Rochester, Kent; 4. Thomas Rome, Groundslow, Staffordshire; 5. William Norman, Hall Bank, Aspatria; 6. George Campbell, Shanes Castle, Antrim; 7. William B. Smith, Stoneleigh Villa, Leamington; 8. John R. Hetherington, Carleton, Carlisle; 9. William Brown, jun., Earlsmill, Forres; 10. Arthur James Hill, Bath; 11. H. R. Goddard, Belsay, Newcastle-on-Tyne; 12. G. Y. Wall, jun., M.R.A.C., Durham; 13. Robert Brydon, The Dene, Seaham Harbour; 14. George Kent Walton, Long Campton, Shipston-on-Stour, Warwickshire; 15. Thomas John Elliot, Wilton, Salisbury; 16. John Gerrard, Veterinary Infirmary, Market Deeping; 17. Colvile Browne, Long Melford, Suffolk; 18. A. H. Ashdown, Uppington, Salop; 19. Adam Ogilvie Torry, St Anne's, Coupar-Angus; 20. Italo Gigliolio, M.R.A.C., Florence; 21. Edward Charles Munby, M.R.A.C., Clifton Holme, York; 22. R. F. Juckes, Cotwall, Wellington, Salop.

STIRLING SHOW.—The Secretary (in the unavoidable absence of Mr Gillon of Wallhouse, chairman of the Committee on General Shows) reported that the arrangements for the meeting at Stirling on the 5th, 6th, 7th, and 8th of August were in a satisfactory state of advancement, and that a most successful show was anticipated.

The entries closed on the 20th current, and the following is a comparative statement of the head of stock, &c. :—

	1873.	1864.
Cattle	406	397
Horses	297	181
Sheep	582	614
Swine	96	76
Poultry	534	252
Implements	1400	973

The district connected with the show comprises the counties of Stirling, Dumbarton, and Clackmannan, and the western division of Perthshire.

The following gentlemen have been named to act on the General Committee of Management:—*Stirlingshire.*—The Duke of Montrose, or, in his absence, H. R. B. Peile, his factor; the Earl of Dunmore, or, in his absence, Archibald Campbell, his factor; Sir

Henry J. Seton Steuart of Touch and Allanton, Bart., Touch House, Stirling; Sir Alex. C. R. Gibson-Maitland of Clifton Hall, Bart., M.P., Sauchie House, Stirling; Sir Wm. C. Bruce of Stenhouse, Bart., Falkirk; Admiral Sir William Edmonstone of Dunkeath, Bart., C.B., Colzium, Kilsyth; A. G. Spiers of Culcreuch, Fintry, Glasgow; William Forbes of Callendar, Falkirk, or, in his absence, W. F. Hamilton, Callendar; Colonel John Murray of Touchadam and Polmaise, Polmaise Castle, Stirling; Henry Fletcher Campbell of Boquhan, Kippen; R. P. Newton of Polmont Bank, Polmont; W. A. M'Lauchlan of Auchentroig, Balfron; John Todd, Binn, Denny; Ralph Stark, Camelon, Falkirk; J. T. S. Paterson, Plean, Stirling; John Coubrough, Blairtummuck, Strathblane; Thomas L. Learmonth of Parkhall, Linlithgow; Alexander Buchanan, Whitehouse, Stirling; Peter Curror, Coxithill, Stirling; David Foyer, Knowhead, Campsie. *Dumbartonshire.*—Sir James Colquhoun of Luss, Bart., Ross-dhu, Luss, failing him, James Colquhoun, yr. of Luss; Sir George Campbell of Succoth, Bart., Garscube, Glasgow; Sir George Hector Leith of Ross, Bart., Ross Priory, Alexandria, N.B.; Sir James Lumsden of Arden, Alexandria, N.B.; Alex. Smollett of Bonhill, Cameron House, Alexandria; John M. Martin, yr. of Auchindennan, Auchenfroe, Cardross; Alexander Whitelaw of Gartshore, ironmaster, Glasgow; James Dalrymple of Woodhead, Kirkintilloch; John Macfarlane, Faslane, Garelochhead; John Marjoribanks, Portkiln, Roseneath; William Fleming, Tillechewan, Alexandria; Alex. Buchanan, Garscadden Mains, New Kilpatrick; John Steele, Shirva, Kirkintilloch; John Anderson, Smithston, Cumbernauld; William Brock, Barns of Clyde, Old Kilpatrick. *Clackmannanshire.*—The Earl of Kellie, Alloa Park, Alloa; Lord Balfour of Burleigh, Kennet House; Alexander Mitchell, Alloa; Robert Mowbray, Cambus, Stirling; James Moir, banker, Alloa; Alexander M'Nab, Glenochil, Alloa; William Allan, Park, Clackmannan; John Ewing, sheriff-clerk, Alloa. *Western District of Perthshire.*—J. B. Hamilton of Leny, Callander; David Carnegie of Stronvar, Lochearnhead; G. H. M. Binning Home of Argaty, Doune; John Campbell of Inverardoch; John Stirling of Kippendavie; H. R. B. Peile, Catter House, Drymen; David Ballingal, Blairdrummond; William Carrack, The Baads, Dunblane; William M'Ewen, Cambushinnie, Dunblane; John Dewar, Castle Farm, Doune; Andrew Glover, Lanrick Castle, Stirling; John M'Nab, Brackland, Callander; H. D. Erskine of Cardross. *Town of Stirling.*—Provost Christie; Bailies Anderson, Millar, Barclay, Muir; James M'Alpine, treasurer of the burgh; James Baird, dean of guild; Councillors Archibald Watt, William Macgregor, William Campbell, Thomas Turnbull, John Murray.

At a meeting of the General Committee, held at Stirling on Friday last, the following sub-committees were appointed:—*Accommodation for Strangers.*—The twelve gentlemen appointed by the town of Stirling; Provost Christie, convener; Bailies Anderson, Millar, Barclay, Muir; Treasurer M'Alpine, Dean of Guild Baird; Councillors Archibald Watt, William Macgregor, William Campbell, Thomas Turnbull, and John Murray. *Admission of Stock.*—H. R. B. Peile, Catter; John Douglas, Gartmore; Alexander Buchanan, Whitehouse; Peter Dewar, King's Park; Convener Watt, Stirling; J. T. S. Paterson, Plean—Mr Peile, convener. *Admission of Implements.* The Earl of Dunmore; Sir Alexander C. R. Gibson-Maitland; H. D. Erskine of Cardross; R. P. Newton of Polmont Bank; Bailie Anderson, Stirling; Archibald Campbell, Dunmore; David Ballingall, Blairdrummond; Robert Patterson, Cardross—Sir A. C. R. Gibson-Mitland, convener. *Admission of Public.*—A. Graham Spiers of Culcreuch; James Johnstone of Alva; Lord Balfour of Burleigh; J. B. Hamilton of Leny; Provost Christie, Stirling; John Campbell of Inverardoch; A. Smollett of Bonhill—John Campbell of Inverardoch, convener. *President's Banquet.*—The Earl of Kellie; the Earl of Dunmore; Sir William Stirling Maxwell; Sir Alexander C. R. Gibson-Maitland; Provost Christie; A. Graham Spiers; H. Fletcher Campbell of Boquhan; A. Smollett—the Earl of Kellie, convener. *Ball.*—The Earl of Kellie; the Earl of Dunmore; Lord Balfour of Burleigh; Sir Alexander C. R. Gibson-Maitland; Sir William Stirling Maxwell; Sir William Edmonstone; Sir William Bruce; Admiral Erskine; H. D. Erskine; James Johnstone; Provost Christie; Peter Curror; J. B. Hamilton; John Murrie; Col. Findlay—Lord Balfour of Burleigh, convener. *Forage Yard.*—Alex. Buchanan, Whitehouse; William Carrick, Baad; James M'Nab, Loaning Bank—Alex. Buchanan, convener. *Police*—Sir Henry Seton Steuart; Sir William Bruce; Sir A. C. R. Gibson-Maitland; A. G. Spiers; William Forbes; H. Fletcher Campbell; Sir William Edmonstone; Sheriff Blackburn; Sheriff Scone; H. R. B. Peile—Sir Henry Seton Steuart, convener. The construction of the showyard is being carried out by Mr Matthew Richardson, Annan, who has on two former occasions—at Dumfries in 1870 and Kelso in 1872—performed the work in a satisfactory manner. The refreshments in the yard will be in the hands of Mr Campbell, of the Royal Hotel, Stirling; Mr Henry Lee, Hope Street, Edinburgh; and Mr Alexander Drysdale, South St Andrew Street, Edinburgh. Arrangements are now being made for the President's dinner, which was fixed for the evening of Wednesday, 6th August. In anticipation of the presence of the President, the Prince of Wales, suitable accommodation is being provided for the proper reception of his Royal Highness. The headquarters of the Society will be at the Golden Lion Hotel. Tickets for the show have been sent to all members residing in the counties embraced in the district of the show, and others will be supplied on application at the office here up to the 26th of July.

The Chemical Department.—Dr **Anderson** said it would not be necessary for him to occupy the time of the meeting at any great length on the present occasion. Of course, the work performed for the Society was, to a considerable extent, of a routine character, with which it was neither necessary nor desirable to occupy the time of the meeting. What had been done during the past half year was of a general character, but the number of cases sent by members for analyses had been smaller than for some years past. That was not more than they could expect, however, as the unfortunate harvest of last year had crippled the resources of the farmers, and the scientific department of agriculture was that in which economy could be most easily effected. They had had a number of analyses of the usual character, and many cases of inferior manures had been brought under their notice, where members, by the exertions of the department, had been able to secure thoroughly efficient articles. During the first part of the year little could be done in the way of investigation. but he had commenced an inquiry into the exact nature of the Peruvian guano which had been recently imported, and which had presented a number of features of interest and peculiarity. The recent imports contained a large number of lumps like clay, which had excited considerable apprehension on the part of the farmers, who thought they might be of inferior quality. These lumps had been a source of considerable difficulty to the farmers, owing to their not possessing the means of reducing them to a fine powder; and some of the manure dealers had had to reduce the lumps to a condition in which the farmer could make use of them. He was not at present in a condition to give a very full account of the peculiarities of the guano; but the investigation was in progress, and he hoped it would be completed in time for the next number of the Transactions. There was another matter connected with the department—namely, the appointment of Mr Dewar, but that would form a subject by itself.

The **Secretary** said he had to report that Mr James Dewar, of the Veterinary College, Edinburgh, had been appointed assistant chemist to the Society. He was now at work in the Veterinary College, and was willing to take samples and make analyses of anything that the members might wish at the same rates as Dr Anderson.

Agricultural Examinations.—Dr **Balfour** reported that at the annual examinations, held on the 26th of March, a certificate and diploma in agriculture were granted to each of the following gentlemen:—Italo Giglioli, Florence, M.R.A.C., Cirencester; 2. E. C. Munby, Clifton Holme, York, M.R.A.C., Cirencester; 3. R. F. Juckes, Cotwall, Wellington, Salop. At the same time a certificate was conferred on R. C. Bruce Willis, 8 Lansdowne Crescent, Cheltenham (also a member of the Royal Agricultural College), who is entitled to present himself for the further examination, in terms of the regulations, for the diploma. Before concluding, Dr Balfour adverted to the new bye-law, under which successful candidates for the Society's agricultural diploma were now eligible to be elected free life members of the Society, as was done to-day for the first time. He also stated that the two prizes of L.6 and L.4, annually voted by the Society to the class of agriculture in the Edinburgh University, were this year awarded to—1. Henry Erskine, Brechin; 2. D. T. Mitchell, Burnton, Laurencekirk, and John Dyer, Edinburgh—equal; and that the prizes had, as usual, been taken in books.

Forestry Examinations.—Dr **Balfour** then reported that the forestry examinations were held on the same days as those under the Agricultural Education Charter, when a first-class certificate was conferred on Mr Peter Loney, Marchmont, Dunse.

Veterinary Department.—The **Secretary**, in the absence of Captain Tod of Howden, reported that the annual examinations for the Society's veterinary certificate were this year held in the Society's Hall, under the following board of examiners:—*Practical Clinique*—Messrs T. A. Dollar, V.S., London; Tom Taylor, V.S., Manchester; John Lawson, V.S., Manchester; Dan. M'Lean, V.S., Glasgow; Finlay Dun, V.S., Warwickshire; Mr Steel, V.S., Biggar. *Veterinary Medicine and Surgery*—Messrs Tom Taylor, V.S., Manchester; John Lawson, V.S. Manchester; Dan. M'Lean, V.S., Glasgow; John Borthwick, V.S., Kirkliston. *Cattle Pathology, with Diseases of Sheep, Pigs, and Dogs*—Mr Aitken, V.S., Kilmarnock; Mr Steel, V.S., Biggar; Mr Dow, V.S., Dunkeld. *Chemistry and Materia Medica*—Professor Anderson, Glasgow; Professor Balfour, Edinburgh; Mr Finlay Dun, V.S., Weston Park, Warwickshire; Mr John Lawson, V.S., Manchester. *Anatomy and Physiology*—Dr Dumbreck, Edinburgh; Dr Charles Dycer, Edinburgh; Mr Cunningham, V.S., Slateford; Mr T. A. Dollar, V.S., London. Twenty-nine gentlemen presented themselves for examination, and the certificate was conferred on the following twenty-six—James Eltoft, Manchester; Charles Marking, Saffron Walden; Justus Littler, Long Clawson; George S. Heatley, Tranent; Peter M'Onie, Drymen; James Hume, Gatehouse-on-Fleet; Robert M'Connell, Castle-Douglas; Peter Low, Strathord, Perth; Edward Sudren, Accrington; A. Robinson, Greenock; John W. T. Moore, London; Charles Brand, Montrose;

Isaac Vaughan, Doncaster; Andrew Hunter, Newcastle-on-Tyne; Thomas Hadfield, Rochdale; Andrew Boyd, Kelso; John Howard, Manchester; Henry Ashbee, India; J. M. Cuthbert, Dumfries; Thomas R. Richardson, Cambo; James Hart, Selkirk; Joseph Casewell, Goldeston, Salop; John M. Watson, Bothel; Matthew C. Mitchell, Dublin; Robert H. Bird, Winchburgh; Thomas Cooper, Preston. The medal granted to the student who passed the best general examination under the Society's Board was awarded to Justus Littler, the second and third students in this examination being A. Hunter and R. H. Bird. The Society also placed at the disposal of the professors of Edinburgh Veterinary College medals for the students who passed the best class examination, and these were awarded as follows:—*Anatomy*—Robert H. Bird, Winchburgh. *Cattle Pathology*—Andrew Hunter, Newcastle-on-Tyne, and Justus Littler, Long Clawson, Melton Mowbray, equal. *Materia Medica*—Justus Littler. *Physiology*—Justus Littler. *Chemistry*—Andrew Hunter. *Veterinary Medicine and Surgery*—Henry Ashbee, India. The gold medal, presented by the examiners in practical clinique, was awarded to Archibald Robinson, Greenock.

TRANSACTIONS.—Mr IRVINE of Drum then submitted volume five (fourth series) of the Transactions. He said that the volume had been issued to 2500 members, but it would be also for any others who might choose to avail themselves of it.

HUMANITY TO ANIMALS.—Mr IRVINE of Drum then said it would be in the recollection of the meeting that the Baroness Burdett Coutts wished that the Society should aid her in devising means for promoting the humane treatment of animals, and especially for inculcating on children in elementary schools their duty in that respect. The subject was considered by the Directors, and the result was that six prizes, from L.5 to L.20, were offered. Forty-four essays were received, and, after careful consideration, the committee adjudged the prizes as follows:—1. William S. Gall, 135 Moore Street, Glasgow; 2. William N. Macdonald, 1 Munro Place, Edinburgh; 3. Andrew B. Dickie, Murdoch's School, Springburn, Glasgow; 4. Miss Isabella Copland, 17 South Mount Street, Aberdeen; 5. Miss Elizabeth Harrower, 12 Picardy Place, Edinburgh; 6. Miss Lizzie Daws, 14 Essex Street, Norwich. A great part of the first prize essay, and extracts from the others, had been printed by the Society and distributed among 2500 schoolmasters and others who were likely to take an interest in the promotion of the object in view.

AGRICULTURAL EPIDEMICS.—Mr MILNE HOME of Wedderburn moved the adoption of the following memorial:—

"To the Right Honourable Her Majesty's Commissioners of the Board of Trade, the Memorial of the Highland and Agricultural Society of Scotland (incorporated by Royal Charter),

"Showeth,—That immense losses are frequently sustained throughout the United Kingdom in consequence of the diseases affecting the potato and other agricultural crops. These crops have an important bearing upon national interests on account of the large amount of food which they supply for human beings and for stock, and also of the useful employment which the cultivation of them gives to a large proportion of the industrial classes. Failures in these crops, therefore, are attended with great loss, by causing a waste of industrial power, unprofitable expenditure of capital, and the withdrawal of money from this country to pay for the necessary importations from abroad. The loss during last year, owing to the failure of the potato crop, has been estimated by parties having intimate knowledge of agricultural matters, to have in one county alone—viz., East Lothian—amounted to nearly L.150,000. The failure was not confined to one district of the United Kingdom. It occurred extensively also in England and Ireland, causing heavy losses to the cultivators, and great inconvenience to the poorer classes, who depend on that esculent for food. Fortunately the disease, at least in the same intensity, does not occur every year. But it occurs frequently; sometimes affecting one or more districts, whilst others escape. Is it not possible to adopt some remedies which may prevent, or even considerably lessen, these failures? That question cannot be answered until the causes of the disease are discovered. The causes of many diseases affecting both animal and vegetable life have been discovered, and successful remedies have in consequence been applied. There is no reason to doubt that the cause of the potato disease is in like manner discoverable, and probably would be discovered, were proper means taken. The expedients which farmers and others have resorted to in the hope of counteracting the disease are various; but not being founded on a knowledge of the causes of the disease, none have proved successful. New varieties of the potato have been planted; soils of different kinds have been tried; special manures have been applied, but with little or no success. When the disease returns it is quite as virulent, and sometimes as widely diffused as before. Your memorialists respectfully urge that the magnitude of the interests at stake, and the admitted obscurity of the subject, alike point to the adoption of a course similar to that followed in regard to cholera and the cattle plague. Let a commission be appointed of men versed in those sciences which are likely to throw light on the subject, with full powers to obtain information, and make the requisite investigations and experiments, Such a commission was appointed by her Majesty's Government in the year 1846, shortly after the potato disease first appeared with great virulence in this country. But little benefit was obtained from the inquiries of that commission as regards any discovery of the cause of the disease. This is not surprising, as then little or nothing was known of its real nature. The condition of the infected plants had not then been studied by either practical farmers or by scientific physiologists. Since that time a large amount of information has been acquired in this country as well as in foreign countries, which, if collected and digested by scientific men, would in all probability yield very important results. All other means have been exhausted. The agricultural and horticultural societies of the country have done what they could, by inviting and obtaining reports from practical men, which reports have been published in their Transactions. These reports describe the phases of the disease, the periods of its appearance, and the numberless expedients tried as remedies. Societies can do no more. To see what might be done, it may not be unprofitable to look at what is done in other countries. In the United States of America there are numerous societies, agricultural and horticultural; and there are also, as in this country, many individuals, generous and enlightened, who investigate and encourage inquiries of public importance. Nevertheless, the Government of that country, actuated by an enlightened and liberal policy, has organised institutions and appointed commissioners at the public expense for the purpose of giving that assistance to agriculture which neither societies nor individuals can provide. In that country officers are selected known for their intimate acquaintance with the different sciences bearing on agriculture, whose duty it is to study the diseases of the crops, to investigate the causes of these diseases, and suggest appropriate remedies. What is the result? Every year valuable reports are issued and largely circulated by the American Government bearing on the science and practice of agriculture. There are reports by entomologists on the insects which attack crops, and the best means of preventing their ravages; reports by chemists on the composition of soils and manures; reports by botanists on the diseases of plants cultivated in America, and on the usefulness and habits of new plants; reports on the meteorology of different districts, and on the relation between the conditions of the atmosphere and the crops. In Portugal, two years ago, a new disease made its appearance among the vines, which greatly injured the quality and quantity of the fruit. An application was made to the Government for aid, on account of the importance of the wine manufactures as well as of the vineyards. A commission of scientific men was appointed by the Portuguese Government to investigate the subject. The result was the discovery of the true cause of the disease, and the recommendation of practical remedies, which are said to have been to a great extent successful. Your memorialists therefore respectfully urge, on account of the importance of the interests involved, that her Majesty's Government would be pleased to appoint a commission to investigate the diseases of agricultural crops, and specially of the potato crop. That public opinion in this country is strongly in favour of something being done by her Majesty's Government in this matter, is evident from what has been said and urged by the most influential representatives of that opinion—the press. The 'Times' newspaper, referring to the potato disease, and the terrible losses sustained by it, asks—'What are we doing, or what have we done, to obviate the recurrence of a disease which is always impending? There is no matter on which science could interfere with more advantage, and we seem to have all the conditions of the problem under control.'—*September* 1872. 'Nature,' a newspaper conducted by men of great scientific abilities, referring to the same subject, asks—'Where are we to find the proper individual or body to start and carry on scientific investigations of this nature?—in private individuals—in societies like the Agricultural or the Horticultural Society—or in the Government? Few will contend in favour of the first alternative. Individuals, no doubt, have been found, and will be found, to spend their lives and lavish their fortunes in investigations in which they have no, or only a remote, pecuniary interest. But it is surely unwise in the extreme to subject our national prosperity to the hazard of private generosity. The societies we have named, and others of a more local character, such as the Highland Society, have done eminent service in promoting sounder views and practices in agriculture and horticulture. But it is questionable whether inquiries of this nature are not beyond their scope, or whether any conclusions at which they might arrive would obtain the universal acceptance which would be desirable. We are, therefore, brought to the third alternative, and compelled to inquire whether we have not a right to look to the Government of this country to interfere in this matter, as Mr Gladstone would term it; that is, to institute and to promote an investigation into the origin, the cause, and the remedies for the potato disease.'—*12th September* 1872. Your memorialists are happy to learn that the right hon. gentleman here referred to admits that there are some fields of inquiry so extensive that they cannot be prosecuted without Government assistance. On a recent occasion, at a public meeting at London, he made the following remarks:—'I do not at all deny that many fields of inquiry have been so much widened and deepened of late years, that it is both becoming and proper for the Government from time to time, pproach ; with a confident hope that you will agree to appoint commissioners to enter on a field of inquiry in which discoveries will probably be made of great national importance."

In supporting the memorial, Mr Milne Home said that the Professor of Agriculture had requested him to explain the matter, in order to give some reasons why they should approach Government on the subject. The title, perhaps, did not sufficiently explain the object of the memorial. There were agricultural epidemics which might apply to stock or crops; but the particular subject to which the Directors thought they might confine themselves was the disease which affected the potato crop, which, however small it might be, was attended with disastrous results. It was estimated that in one county alone—East Lothian—the loss amounted to L.100,000; and supposing it was the same in other parts of the kingdom, the loss would amount to many millions. It was not merely a loss to the farmers, but an inconvenience to the working and middle classes, by the loss of an esculent on which they depended to a great extent for food. The epidemic being not only a pecuniary loss, but an inconvenience to the country, he thought it was a subject which deserved the attention of the Society, and also the attention of the Government. They were aware that there had been other cases where losses had been sustained by various diseases; but with regard to this in particular there had been various expedients tried during the last thirty or forty years; because it had from time to time made its appearance. No one knew how to meet it when it did come, although various expedients had been tried. The roots had been raised from the apples, new potatoes had been put in, and various kinds of manure had been tried, but without effect. The reason was obvious. They did not know the cause, and till they knew that it was scarcely possible to get a remedy. There had been epidemics affecting stock in which the cause had been found and remedies had also been found. There had been various causes assigned for the potato disease—some of them fair enough—while others were of the wildest description. One said it was owing to the weather, others that it was owing to degeneracy through over-cultivation; others that it was due to a fungus, the spores of which were floating in the amosphere and attached themselves to the leaf of the potato, as it was found to attach to other plants; and others had gone the length of alleging that it was due to the spots of the sun, and that as these spots reached a maximum every eleven years, so the disease returning every eleventh year it was thought right that the farmer should not that year grow potatoes, but save the seed. He mentioned that to show that, whatever the cause might be, their remedy must be dependent on the nature of the cause, and they had several precedents for that. They knew that there were various diseases of a serious character affecting both animal and vegetable life, which had been a subject of investigation. He might refer to smallpox, cholera, and rinderpest, in regard to which there had been scientific investigations, and the result had been, if not actually to discover the causes, at all events to approximate very nearly to these. Such subjects had received legislative enactment, and the inquiries instituted had resulted in great and beneficial effects to the community at large. It was right that these investigations should commence with animal life. Investigations in regard to vegetable life had, however, been taken up in such a way as would likely be productive of effect. For instance, in the case of the vines: there were two diseases which had affected them in France and Portugal. One of these was a fungus, and it was found that a remedy could be provided by the application of sulphur. There was a more recent disease, which was due to an insect. The Government of Portugal had appointed a commission of scientific men to inquire into the matter, and a remedy had been provided. He might also mention a disease which had attacked the silkworm in France, and the result of a commission appointed to inquire into it was to find out as a cause of the disease a parasitic fungus; and he was glad to learn that the recommendations of the commission had had almost entirely the effect of curing the disease, which had been "stamped out" in France, and the production of silk was restored to what it was formerly. The American Government had paid a great deal of attention to such subjects. A volume had been published in which reference was made to the potato crop and to the various diseases which affected it. He saw that one of the chief diseases was from insects. He had before him a very interesting report, extending to thirty or forty pages, from a scientific entomologist, from which it appeared that insects travelled in great flocks from west to east a distance of sixty miles a year, invading one State after another. In the report were mentioned the places where these insects first appeared, and the names of the States which had been attacked. These were also cases which afforded precedents for investigating this important subject. He could not, in referring to America, avoid noticing the very liberal and enlighted manner in which the Government gave assistance to agriculture in various ways. He held in his hand a report to the President of the United States, and an abstract of money placed at the disposal of the commissioners, amounting to 276,000 dollars—equal to between L.50,000 and L.60,000—given by the Federal Government for agricultural objects. They had an experimental farm, a chemist, and no end of scientific men—a State chemist, a State entomologist, and various other officials who had given very useful and important reports. Not only did the Federal Government contribute to these objects, but in almost each of the separate States of America there were an agricultural college, an experimental farm, and liberal endowments given to each of those who promoted agricultural discovery. He should not forget that in France and Germany there were many experimental farms, and he thought that the Government ought to be thankful to them for the opportunity of now approaching them, and pointing out the immense interests involved in the losses by epidemics. The Directors had, however, thought it better to confine themselves to one subject. Many years ago, when the disease broke out, about 1846 or 1847, a commission was appointed, but little was at that time ascertained regarding it. However, since then, a large amount of information had been obtained on the subject not only by the Society, but also by the English and other societies. They had offered prizes in connection with the subject; and the reports, which were full of information, might be made of good account by scientific men. He might mention that the public press of this country, which so properly reflected public opinion, had called the attention of the Government to the matter. After reading the extracts given in the memorial from the "Times" and "Nature," as also the opinion of Mr Gladstone, he went on to say that the Directors were of opinion that this was one of those subjects with which the Directors might properly interfere. Practical agriculturists had done what they could, but they had not been able to ascertain a remedy for the evil; and the Society now asked the Government to do what other Governments did—to come forward and appoint a body of scientific men to inquire into the matter, in which great interests were involved, and as to which there were great difficulty and obscurity. He concluded by moving the adoption of the memorial.

The noble **Chairman** said they were very much obliged to Mr Milne Home for the interesting statement he had made in regard to the memorial. He had not exaggerated the importance of the subject he had brought before them. He (the Chairman) did not think there was much chance of getting much money out of the Government for the purpose of the investigation. But, although Mr Lowe might not be inclined to spend money, still that was no reason why they should not expect some satisfactory result from the memorial. The question before the meeting was whether the memorial be adopted.

Professor **Balfour** said that not long ago he had had a letter from Mr Ayrton, stating that he wondered why nothing was being done in regard to the subject now before the Society. Mr Ayrton wrote spontaneously, and in reply he said that it was an important matter, but that it would involve great expense. He also stated in his reply that he hoped Mr Ayrton would do what he could to assist them.

The noble **Chairman**—I hope he will.

Mr **Milne Home**—That shows that the Government are aware of the subject, and the importance of having it investigated.

The memorial was unanimously adopted.

Contagious Diseases (Animals) Act.—The **Secretary** stated that since last general meeting the Directors had sent a memorial on the subject of the Contagious Diseases (Animals) Act. The memorial had appeared in the newspapers some time ago. When the memorial arrived at the Privy Council Office, a committee of the House of Commons had been appointed to examine into the working of the Act. Since then the Society had been requested to send up the names of parties to give evidence before the committee, and Mr Barclay, the member for Forfarshire, had been in correspondence with him (Mr Menzies) on the subject. They had sent up several names to him, with precognitions, and it was likely they would be called before the committee. These persons were Mr Walker of Bowland, chairman of the Local Authority in Edinburgh; Mr List, the inspector for Haddingtonshire; Mr George Stewart, veterinary surgeon, Perth, veterinary inspector for Perthshire; and Mr Milne, Hill of Craigo, Montrose, who had been taking a great interest in the conveyance of animals by rail, and who had invented a new sort of truck, which they hoped to see the railway companies adopt by-and-bye.

The memorial was approved.

A vote of thanks was then given to the Chairman, and the proceedings terminated.

GENERAL MEETING, 21st JANUARY 1874.

The Marquis of LOTHIAN, Vice-President, in the Chair.

THE MARRIAGE OF THE DUKE OF EDINBURGH.—The noble CHAIRMAN said—My first duty to-day is to move that two congratulatory addresses be sent—one to Her Majesty the Queen, and the other to His Royal Highness the Duke of Edinburgh—upon the marriage of His Royal Highness to the Grand Duchess Marie of Russia. As to the first address—that to Her Majesty—I need say no more than that to us, in common with all loyal subjects of the Queen, every year of Her Majesty's reign increases the more than interest that is felt in all that concerns Her Majesty's domestic happiness. (Applause.) I do not think that anything can more concern that domestic happiness than the marriage of her son, and the bringing of a new daughter to her home. (Applause.) I do not think that I need say more in reference to the address to the Duke of Edinburgh, congratulating him on his marriage, than that the marriage is one worthy in every respect of a Prince of the Royal House of Great Britain. (Applause.) I have an additional pleasure in moving this congratulatory address to Her Majesty, from the fact that she is a member of the Highland and Agricultural Society. Although, from his profession, the Duke of Edinburgh cannot be expected to take so much interest in the Society, yet his eldest brother, the Prince of Wales, is at this moment President of the Society. (Applause.) I move that these addresses of congratulation to Her Majesty and His Royal Highness the Duke of Edinburgh be passed by the Society with acclamation. (Applause.)

The following were the addresses above referred to:—

"To Her Most Excellent Majesty the Queen.—Most Gracious Sovereign,—We, your Majesty's faithful and loyal subjects, the Highland and Agricultural Society of Scotland, incorporated by Royal Charter, now assembled in general meeting, feel it a most gratifying duty, on the occasion of the marriage of His Royal Highness the Duke of Edinburgh with the Grand Duchess Marie of Russia, to approach the Throne with the homage of our heartfelt congratulations, and to express the part we take in the general rejoicings which so desirable an event has caused throughout the British dominions. We again tender our devoted attachment to your sacred person and our loyalty to your Throne, and we pray that the union of H.R.H. the Duke of Edinburgh with the illustrious House of Russia may be a lasting source, as well of domestic comfort as of support under your royal duties, and that your reign may be long, prosperous, and happy.—Sealed with the corporate seal of the Society, and signed by the Most Noble Schomberg Henry, Marquis of Lothian, senior vice-president in office, in presence and at desire of the meeting. Edinburgh, 21st January 1874."

"To His Royal Highness Prince Alfred Ernest Albert, Duke of Edinburgh.—May it please your Royal Highness,—We, the Highland and Agricultural Society of Scotland, incorporated by Royal Charter, in general meeting assembled, beg leave to lay before your Royal Highness our sincere congratulations on the occasion of your marriage with the Grand Duchess Marie of Russia, and to express the satisfaction which, in concert with the rest of this great kingdom, we feel in the joy which this auspicious event has occasioned. We earnestly pray that the union of your Royal Highness with the Imperial House of Russia may long be a source of domestic comfort and true happiness to yourself and your royal bride, as well as to the illustrious families thus auspiciously connected.—Sealed," &c.

ELECTION OF MEMBERS.—Ninety-five gentlemen were balloted for and elected as members.

ELECTION OF OFFICE-BEARERS.—The SECRETARY then read the following list of office-bearers proposed for the ensuing year:—*Vice-Presidents*—The Right Hon. the Earl of Seafield; the Hon. the Master of Lovat. *Ordinary Directors*—George Brown, Westertown, Fochabers; John Dove, Crosshall, Coldstream; H. D. Erskine of Cardross, Stirling; Robert Hutchison of Carlowrie, Kirkliston; Colonel Innes of Learney, Torphins; Bryden Monteith, Liberton Tower Mains, Liberton; Robert Stewart of Ingliston, Ratho; Robert Wilson, Durn, Perth. *Extraordinary Directors*—Sir Archibald Dunbar of Northfield, Bart.; Sir Kenneth S. Mackenzie of Gairloch, Bart.; Alexander Henderson of Stemster; George Loch of Embo; Colonel William Fraser Tytler of Aldourie; Colonel Ross of Cromarty.

Mr BARCLAY, M.P., said he rose to move an amendment to the list of office-bearers now proposed. It was well known that a deputation from the Aberdeenshire district met the Directors that morning to consider the affairs and position of the Highland Society, and at that meeting there was a generally expressed opinion among those present, that whatever proposal should be adopted, it was one of cardinal importance that, if possible, practical men—men acquainted with the wants of agriculture and its affairs, and having considerable influence in the councils of this Society—should be elected. (Applause.) He thought that the Directors had been exceedingly fortunate in their selection of a gentleman to represent the Society in the northern district; and he was sure that the nomination of Mr Brown of Westerton would meet with the approval of every member of the Society in the north of Scotland. (Applause.) At the same time, he regretted that the Directors had not been equally fortunate in the member proposed to represent the north-eastern districts of Scotland. He would have been very willing to have avoided the somewhat invidious task of not only nominating a Director, but also objecting to one. He wished the Secretary to inform him if it were necessary, in nominating a Director, to mention the name of the gentleman whose election he was going to oppose?

The noble CHAIRMAN—I think it would be advisable for you to do so, otherwise it would compromise the whole list of Directors.

Mr BARCLAY said that the gentleman whom he had the honour to nominate was Mr M'Combie of Tillyfour, M.P. for West Aberdeenshire; and the gentleman whom he selected to be put against him was Colonel Innes of Learney. He did so because he inferred the Directors had selected him to represent the north-eastern district of Scotland, deferring to a certain extent to the wishes expressed at Aberdeen. If a practical farmer and one who took great interest in the affairs of the Highland and Agricultural Society—Mr Copland, Mill of Ardlethen—had been proposed, the gentlemen from Aberdeenshire would have cordially supported that nomination. But assured as they were that Mr M'Combie was remarkably well qualified for the duties of the office, and seeing the position which Mr M'Combie held both as an agriculturist and representative of the farmers of the north-eastern district, Mr M'Combie presented himself at once to those who came from Aberdeen and the representatives of the Aberdeen meeting as a highly eligible candidate to name on this occasion, and would well and ably represent the north-eastern district of Scotland. As regarded Colonel Innes, he would say nothing; and in reference to Mr M'Combie it was fortunately unnecessary for him to make any remarks. Mr M'Combie was, he believed, one of the oldest members of the Society; he was one of the oldest exhibitors, and he thought he was not far wrong in saying that he was also one of the most extensive exhibitors. He had further not only the reputation in Aberdeenshire, but throughout Scotland and Great Britain—and he might even extend the area—as one of the foremost agriculturists of the day. Therefore it seemed remarkable why Mr M'Combie should not have been selected a Director before now. (Applause.) He understood that some fifteen years ago Mr M'Combie was nominated a Director, but his nomination was not carried—he was defeated by a very small majority. He was informed that one serious objection to Mr M'Combie at that time was—and he wished to call attention to a subject that would likely turn up in the course of the meeting—that as he was a large exhibitor of polled cattle, the other exhibitors of polled cattle in the north of Scotland would be likely to have less confidence in the judges nominated; that, provided that Mr M'Combie was a Director, the exhibitors outside the directory would be of opinion that he would have a great deal to say in the selection of judges. It was unnecessary for him to dwell on that objection. Certainly he thought it had a certain amount of force, if the practice was, as generally supposed outside, that the Directors appointed the judges; but he understood from what had passed that morning, and also from the action of the Directors in appointing Mr Brown of Westerton a Director, who was also a large exhibitor of stock, that they no longer regarded that as a serious objection. Therefore he should hope that the suggestion he had now made, if it could not be agreed to by the Directors without a division, would be largely supported and carried by this meeting. It was unnecessary to dwell on the qualifications of Mr M'Combie, and he would only say this further, that if he was elected a Director, it would show the members of the Society in the north-eastern district of Scotland, that the Directors were anxious to have placed in the directory those best acquainted with the wants of agriculturists, and the men most experienced in the breeding of cattle exhibited at the shows. He begged to move that Mr M'Combie be elected a Director in room of Colonel Innes.

Mr HARRIS, Earnhill, seconded the motion. He was always unwilling to do anything that would interfere with the action of a responsible board of directors of any institution; but seeing that the Directors' selection seemed to have partaken of a territorial character, he could only characterise the leaving out of Mr M'Combie as a glaring omission. A great friend of this Society, at its annual show Mr M'Combie was an old exhibitor, and a considerable feeder and breeder of a well-known breed of cattle, the maintaining of which had done a very great deal for Scotland. In regard to the estimation in which Mr M'Combie was held by his neighbours, that was well proved by the fact that he sat for the division of his county in Parliament. He repeated that he could not understand how, in any wish to represent the agriculturists of Aberdeenshire, Mr M'Combie could be overlooked. It was very much like the play of "Hamlet," with Hamlet left out.

Mr HARVEY, Whittingham Mains, said that, as a practical director attending its meetings very regularly, sometimes at considerable inconvenience, he would hail Mr M'Combie as a member of the Board, if he attended. No one could doubt his qualifications and his respectability, and his knowledge of everything connected with agriculture in the north of Scotland. He hoped that Mr M'Combie would occasionally make a point of attending the meetings, and not come, as many men did, looking for "plundering and blundering."

Mr JOHN M. MARTIN, yr. of Auchendennan, stated that from the list of Directors which was proposed, speaking for the western counties of Scotland, they would be infinitely worse next year than they were last. In the list of Extraordinary Directors which had been read, there was no name included from the west for that of their late Lord-Lieutenant, Sir James Colquhoun. At a late meeting held in Glasgow, in the interests of the Society, it was mentioned that they in the western district had not so much room for complaint as was supposed, because they had of Extraordinary Directors, Mr Alexander Smollett of Bonhill; and of Ordinary Directors, Mr Baird of Cambusdoon and Mr Young of Keir Mains. The name of the latter was one of those given as retiring Directors this year, so that they this year lost one of these three. On the score of having practical farmers to represent all the districts of Scotland, he asked the meeting for a moment to consider how they were represented in the west. In the Convener of Dumbartonshire they had a gentleman known in all agricultural matters connected with that district which warranted his position. Mr Young of Keir Mains knew intimately, no doubt, matters connected with the west of Scotland, but he was resident in Stirlingshire, while he had little to do with their local agricultural societies, and could not be said to represent, practically, the farmers of the west of Scotland. Mr Baird of Cambusdoon took a warm interest in all those matters, but every one knew that he was not a practical farmer. At the meeting in Glasgow, hope was held out that something might be done to meet their views in the west; but there was not a single name from the west country added to the list; in fact, one, as he had shown, who was said to be their representative, was excluded. They were not quite so prepared as the gentlemen in the north. They asked if they would send a deputation, but Mr Menzies thought that unnecessary, as he had no doubt that the Directors would give effect to their suggestions. Unless something were done to give more representation to those counties, he feared the matter must come up at another meeting.

The Marquis of HUNTLY said he was anxious to dispel any view there might be in the meeting as to what might appear to be the invidiousness of substituting the name of Mr M'Combie for that of Colonel Innes. He knew both Colonel Innes and Mr M'Combie well, and personally he believed those who proposed Mr M'Combie had no wish to appear as opponents to Colonel Innes, though their feeling was that he would be a better representative of the agricultural interests of the northern parts of Scotland than Colonel Innes. He might say that Colonel Innes was abroad at the time of the first meeting in Aberdeen in connection with the Highland Society, or else, he believed, he would have been with them. But Mr M'Combie took very great interest in the meeting, and although it might not have done all the good they wished it to do, yet it had done some good; it had stirred up public feeling in connection with the Society, and he believed it would eventually do good to the Society itself. The general feeling from Mr M'Combie's age and experience, and the benefits he had conferred on agriculture in the north, was that he was a representative man; a farmer's representative as well as a laird's. He would make a more suitable representative on the directorate than Colonel Innes, although they did not in any way disparage the merits of Colonel Innes himself.

The noble CHAIRMAN said, that as having been in the chair at the meeting of the Board of Directors, he supposed he might say a few words as to what took place when a telegram which had been sent by Mr Barclay was received. He thanked Mr Barclay for his courtesy in sending that telegram, telling them what he proposed to do, as he did not know that, according to actual law, he was obliged to give notice before hand at all. When the telegram was received announcing Mr Barclay's intention to nominate Mr M'Combie to sit upon the Board of Directors, if it had been possible to do so, the Board would have at once agreed to the suggestion; but, on consideration, the Directors found themselves in this difficulty, that the names of those proposed to be placed on the list of Directors had already been sent to them, and in every case the proposal had been accepted by the gentlemen to whom it was sent. They thought they could not, at a moment's notice, without communicating with these gentlemen, agree to withdraw a name from the list which they (the Directors) themselves had proposed. The only other alternative was this—he stated that, to show how anxious the Directors were to effect, if possible, to the views of Mr Barclay, and admit Mr M'Combie as a Director—that one of the present Board of Directors should withdraw. The Directors did not like to suggest any one who ought to do so, with so very little notice. There were many who would willingly have done so if it were desired by the whole body, but he was sure there was none who wished Mr M'Combie to be a Director, who would desire any present Director to withdraw for the purpose of admitting him. He thought that the meeting would see that it was absolutely out of the power of the Directors to make the alteration themselves. They felt in duty bound to stand by the list they had prepared of the gentlemen named, all of whom had accepted office. Further, these names had been advertised for fourteen days, according to the bye-laws of the Society. He hoped that if the question came to a division, it would be taken on the merits of the question itself, and not from any supposition that the Directors did not wish, in all cases of this kind, to select as new members for the board of direction those who were most calculated to advance the interests of agriculture in every way. Boards of directors, like every other mortals, were liable to make mistakes, and might not in all cases seem to have chosen those who, according to the opinion of persons in the district, were the best; but he hoped that the general members of the Society would give the board credit for their desire to select in all cases those who were best fitted to promote the interests of agriculture in the various districts of Scotland from which they were chosen.

Mr **Moubray**, Cambus Distillery, Stirling, stated that if they were to go upon the principles of having something like territorial representation, the first thing they should do was to put the constitution right which limited their selection to Edinburgh. They should bring their rules in accordance with their practice, and, still more, in accordance with the voice of Scotland.

Major **Hamilton**, M.P., said that, as Chairman of the Glasgow meeting, he might state that the feeling of the majority there was that they did not require to come to the meeting that day, as the Directors would give effect to their suggestions. But supposing that they came to a division, and Mr M'Combie's name was carried, nobody meant it as the slightest objection to the policy of the Directors; and the meeting generally, he was sure, did not mean it as a slur upon them in any way.

The **Secretary** said he wished to be allowed to say a word as to the meeting in Glasgow. At that meeting he told Mr Martin that the Directors would be most happy and willing to take these suggestions into consideration, but he never for one moment alluded to the Directors of this year. The list was published a fortnight before the meeting in Glasgow, and it was impossible for the Directors to go back on what they had done.

A division then took place, when the list of Directors as originally proposed was agreed to by a large majority.

The Hon. **George Waldegrave Leslie**—I wish to know, before we pass from this subject, whether there is to be any change in the committees for next year?

The noble **Chairman**—The Directors will do that afterwards.

The Hon. **George Waldegrave Leslie**—I have drawn attention to this for the purpose of saying that I would like the name of the Marquis of Huntly put on the Cottage Committee.

The noble **Chairman**—That will come up afterwards.

Alteration on Bye-Law.—Mr **Irvine** of Drum said he had given notice of an addition to one of the bye-laws. It could not be in regular form adopted at that meeting, as it must pass two successive meetings of Directors, and then come up at the next general meeting to be approved. He hoped it would afford the Directors the means of further information as to the opinion of members generally as to who are the proper and fit persons to be office-bearers. He begged to move that "The Secretary shall, twenty-one days before the meeting of Directors, at which the Directors for the ensuing year are to be selected, intimate by advertisement that the Directors are prepared to receive the names of members of the Society, from which may be selected the names to be recommended to the general meeting, and published in terms of the existing bye-laws."

Another Alteration on Bye-Law.—Mr **Murray** of Dollerie proposed an alteration on bye-law No. 5. He said that by the Charter the number of Vice-Presidents is limited to four, and the number of Extraordinary Directors to ten; and bye-law No. 5 declares that the two senior Vice-Presidents, and such number of the Extraordinary Directors not being fewer than two, not more than five, as the Society may determine, shall retire annually. These office-bearers are generally selected with the view of receiving the assistance on the occasion of the general show, and the Directors believe that it would be of considerable advantage were it in the power of the Society to elect four new Vice-Presidents and ten new Extraordinary Directors each year. The proposed alteration was agreed to.

The Accounts.—The Right Hon. Sir **William Gibson-Craig** of Riccarton, Bart., laid on the table the accounts for the past year, which were approved of.

Argyll Naval Fund.—Admiral Sir **William Hope Johnstone**, K.C.B., laid on the table the accounts of the Argyll Naval Fund, which were adopted.

Stirling Show, 1873.—Mr **Hunter** of Thurston, in the absence of Mr Gillon of Wallhouse, moved a series of resolutions of thanks to the parties for whose co-operation the Society was so much obliged on the occasion of the late meeting at Stirling—in particular, the attention of the meeting was called to the manner in which the Earl of Dunmore had forwarded the interests of the Society, and to the services rendered by Sir Alexander Gibson-Maitland:—"1. That the thanks of the Society be given to the Right Hon. the Earl of Dunmore, who, as Vice-President of the Society, attended the general show at Stirling in August last, for the lively interest his Lordship took in the proceedings, and for the highly satisfactory manner in which he discharged the duties of Chairman at the President's dinner, in the unavoidable absence of His Royal Highness the Prince of Wales, the President of the Society. 2. That the thanks of the Society be given to Sir Alexander C. R. Gibson-Maitland of Clifton Hall, Bart., M.P., Chairman, [illegible] Stirling S [illegible] That the thanks of the Society be giv[illegible] counties of Stirling, Dumbarton, Clackmanan, and Perth, for their liberal contributions in aid of the auxiliary fund for the Stirling Show. 4. That the thanks of the Society be given to the Magistrates of Stirling for their assistance and co-operation in the business connected with the meeting held at Stirling."

The resolutions were approved of.

INVERNESS SHOW, 1874.—Mr HUNTER reported that all the arrangements for the show to be held at Inverness, from the 28th to the 31st of July, are going on most favourably. The Directors had to submit for the approval of the meeting a list of premiums amounting to a total of L.2020, 16s., being an increase over the last show at Inverness, in 1865, of L.720. The list was submitted to a large meeting held at Inverness in December, when it was unanimously agreed to. The L.50 prize for the best thorough-bred stallion will be competed for at Inverness on Friday the 20th of March, and he mentioned that one of the conditions attached to this prize is that the prize horse must serve this season in the district connected with the show. The Directors have selected a field for the show-yard on Seafield Farm—a site admirably suited for the purpose, being quite close to the railway station and the town of Inverness.

The Directors have named the Master of Lovat, Chairman, and Mr James Anderson, clerk of supply, Inverness, Secretary, of the Local Committee.

This was approved of.

The Marquis of HUNTLY said he wished to get some information as to the increase of premiums at the forthcoming show at Inverness.

The SECRETARY explained that the prize for the best bull was increased to L.25, the second to L.15, and the third to L.10.

The Marquis of HUNTLY said he would have preferred that there should have been four prizes, as follows:—L.20, L.10, L.7, and L.5.

The noble CHAIRMAN said it was too late for the Directors to alter the prizes, as they had been approved of by the committee in the district; but any alteration that might be thought proper could be made in time for the next show.

Mr HUNTER of Thurston said that the premium list for the Glasgow Show would be taken into consideration next December.

The Marquis of HUNTLY said, with reference to the proposal to have bothies and refreshment-rooms for the men attending the stock, that he thought the expense might be added to the entrance fees for cattle, which at present amounted to 10s. He would be glad to pay 2s. additional in order to meet the expense.

The CHAIRMAN said that the Directors had agreed as to the necessity for bothies and refreshment-rooms for the men; but as to the question of defraying the expense, that could be settled afterwards.

Mr HARRIS asked the Directors if they had taken up the questions as to forage and other matters which had been brought under their attention by the deputation from Aberdeen?

The noble CHAIRMAN said that the Board of Directors had not yet had time to take up the different questions brought before them.

GLASGOW SHOW, 1875.—Mr HUNTER reported that during last autumn several requisitions were sent to the Society from the counties connected with the Glasgow district in regard to holding the general show for 1875 at Glasgow. The requisitions having been brought before the Board at their meeting in November, the proposal was favourably entertained, and it was referred to the General Show Committee to name the classes of stock. The list having been sanctioned by the Directors at their December meeting, was submitted to a meeting of members held in Glasgow the same month, and agreed to unanimously. The scale of premiums will be fixed in November next, and as the Directors have sanctioned a very liberal one for Inverness, they will doubtless submit a list worthy of the great and important counties embraced in the western district. He moved—"That the meeting agree to hold the general show for 1875 at Glasgow for the district comprehending the counties of Lanark, Renfrew, Argyll, Ayr, and Bute."

This was agreed to.

Sir MICHAEL SHAW STEWART of Ardgowan, Bart., asked if the meeting for the settlement of the premiums of the Glasgow Show would be held in that city with the district committee?

Mr HUNTER said it would be held in Edinburgh.

Sir MICHAEL SHAW STEWART said they had been told that the list of the Inverness Show had been approved of by the local committee, and that the Directors could not alter it. He wanted to know if the Directors were to fix the premiums for the Glasgow Show without any consultation with the local directors or extraordinary directors, or in what way it was to be done? That was an important question. There was a feeling of amity in the west towards the Society, and there was also a feeling in regard to the premiums. Nobody in the west of Scotland would be the worse of knowing how the premiums were to be arranged.

The noble CHAIRMAN said that the practice had been that the list of premiums and all details were settled by the Directors, and then forwarded to the district committee, who, if they thought necessary, referred the matter back to the Directors. The Inverness committee had already approved of the list.

DISTRICT SHOWS.—Mr PETTIGREW WILSON of Polquhairn reported as follows:—The money premiums awarded in 1873 amount to L.415, 10s., besides 10 silver, 273 medium silver, 80 minor silver, and 184 plough medals. As the names of the successful competitors and the award to each will appear in the next volume of the Transactions, it is unnecessary to detain the meeting further than by stating that the general results of the different competitions have been highly satisfactory. It has long been the opinion of the Directors that the funds of the Society could not be more beneficially applied than in aiding the efforts of local societies, and with this view it has been the aim of the Directors in adjusting the premiums for the current year to make arrangements for a greater number of districts than has ever been in the list before. The list for 1874, as submitted, was agreed to.

COTTAGE COMPETITIONS.—Mr MAXWELL INGLIS of Loganbank reported as follows:—The money premiums awarded amount to L.31, besides 31 medium and 42 minor silver medals, making a total expenditure of L.60, 8s. The premiums to be offered in 1874 are—25 parishes at L.3 and 4 medals each; 25 districts at 2 medals each; improving existing cottages and building new cottages, gold medal. The only change in the regulations has been with reference to rent. According to the old rule the annual value of each cottage with the ground must not have exceeded L.5. It is now to be left to the committee of the district to regulate the maximum rent of the cottages, which may be from L.5 to L7. The committee believe that this will tend to enlarge the number of competitors, without changing the character of those originally intended when the present rules were arranged.

Mr INGLIS went on to say that as to Mr Waldegrave Leslie's suggestion to put the Marquis of Huntly's name on the Cottage Committee, he had only to remark that if he had the honour of continuing to hold the office of chairman the suggestion would be attended to.

The Marquis of HUNTLY said he would be very glad to act on the committee, but there was a point to which he wished to allude. At present no cottager who paid more than L.5 for his cottage was eligible. Now, he was convener of the committee in Upper Deeside, and he had gone through the whole district, but the committee could not give the medals away, because the cottages below L.5 were so miserable that they did not think they were deserving of them. He would like to understand if the disposal of the premiums would be at the discretion of the committee, because some of the feuars might compete for them. He thought the premiums should be for *bona fide* cottagers alone.

The SECRETARY said it was left to the committee to protect the Society in such a case as was referred to, and it was not contemplated that feuars were not to compete.

The Marquis of HUNTLY said he knew that in horticultural societies feuars of L.10 very often carried off the prizes against the cottagers.

THE CHEMICAL DEPARTMENT.—The noble CHAIRMAN said that a considerable change had taken place in this department by the resignation, received that morning, of Dr Anderson. He did not give up his office till July, in order to give the Society time to appoint his successor. Professor Dewar had a report from Dr Anderson, and he would be glad to give any information as to the department. He had only been six months in the office, and could not yet be intimately acquainted with it.

The SECRETARY then read a letter from Dr Anderson, giving in his resignation on account of ill health.

The noble CHAIRMAN said he felt quite certain that, at the time when the resignation of Dr Anderson came into effect, the Society would bear some testimony to the high esteem in which he was held.

Professor DEWAR then read the following report by Professor Anderson:—"On reporting on the condition of the Chemical Department during the past year, although there is much to interest the chemist, there is not much to occupy the time of a general meeting at great length. The number of analyses sent by members of the Society has been rather less than during the last few years, but the character of the results has been similar. The quality of the manures has generally been rather lower than formerly—a result which no doubt is owing to the high price of the raw material; but there has not been any increase in the amount of adulteration. I need scarcely say there have been numerous cases of inferior manures, especially among superphosphates, many of which, although sold under the name of dissolved bones, are really complex mixtures, in which coprolites and other inferior phosphates have been used, sometimes to a very considerable extent. The manures in some cases have been sold at a proportionate price, but there is no doubt also that others have been charged at as high a rate as the samples made nearly or entirely from bones and acid. In some cases phosphatic guanos have been used in the manufacture of superphosphates; but this has not been done largely, and the use of dissolved phosphatic guanos in this country has not reached the magnitude which it has in Germany. At the present time Germany offers the largest market for phosphatic guanos, which are there chiefly employed in the dissolved state, and as I understand with very good effect. Dissolved Peruvian guano is used in this country in considerable quantity, and I imagine with good results, as its use seems to be increasing; and a Continental firm has begun to manufacture it in this country on a large scale, and of a quality which will merit the attention of the farmer; and should the quality be equal to the guarantee, I believe that the results obtained by its intelligent use in soils in good condition cannot be otherwise than satisfactory. We shall await with interest the reports of any farmers who may try it during the coming season. While there has been no change of importance in the general nature of the manures in use, I am able to give a greatly improved account of the oilcakes. Although there have been instances of inferior quality of oilcakes, there has been during the past year scarcely any instance of deliberate adulteration with inferior foreign seeds. The inferior samples which have come under my notice I believe to have been made from dirty and ill-cultivated linseed, and in this way there is room for improvement, for I have seen samples sold as linseed of which 40 or 50 per cent. consisted of the seeds of various weeds which have grown among the flax; but in this respect even there is some improvement, for the crushers are now much more cautious than they used to be, as inferior linseeds are much less saleable than formerly. The number of waters sent to the laboratory for analysis has been unusually large; they have been obtained from farms, private houses, and from the wells in villages and in small towns, and they amply bear out the opinion I have more than once expressed at the meetings of the Society, that additional care is necessary in the selection of water for domestic use. The majority of waters examined have been contaminated with animal matter, as indicated by the presence of nitric acid, which in some cases has amounted to about five or six grains per gallon. This is not the time or place to enter into full details on this head. I will only remark that such waters may and have been used for a long period without any bad consequences; but their use is not to be recommended, and they may at any time become injurious. I have endeavoured to ascertain whether any effect has been observed in the health of farm stock supplied with such waters, but on this point I regret to say I have failed to obtain any definite information. There is no doubt that much fraud still exists in the sale of manures, and much carelessness among farmers in the purchase of them; and I am sorry to say I constantly see manures sold by defective analyses, which greatly overrates the value of the article of which they profess to give the composition. Of course, such analyses are in great demand among manure manufacturers, and it is most necessary that farmers should guard against them. During the past year, as all the members well know, an assistant chemist has been appointed to attend to the interest of the members of the Society in the east of Scotland; and I shall leave it to Mr Dewar, of whom I have a very high opinion, to report on the work which he has done."

Professor **Dewar** then read his own report:—"As assistant chemist to the Highland Society, I have to report that since the Edinburgh Chemical Department came into operation only a commencement of analytical work can be notified to the Society. During the past six months only some five samples of manures have been forwarded to the laboratory for examination; and during the whole of this period no application has been received from any agricultural association requesting lectures on the application of chemistry to agriculture, or the execution of the field experiments proposed by the Society." Professor Dewar went on to say that he cordially thanked the Society for the appointment he had received. He might say that he had prepared himself specially for the peripatetic lecture expedition, but he had not been requested to do anything of the kind.

Mr **Barclay**, M.P., said he thought it would be highly important that the Society should have some idea of the mind of the Directors as to the Chemical Department before proceeding to fill up the appointment which he was sorry to learn was to be vacant by the resignation of Dr Anderson. He had not the slightest reflection to make on Dr Anderson, but what seemed to be necessary for the Society was to have a gentleman appointed as nearly as possible possessed of the high qualifications of Dr Anderson to devote his whole time to scientific investigations. The farmers were very destitute of that technical education which it would be advantageous for them to have. He thought that the farmers should see that the technical education they required was made available, as far as possible, at the national schools under their charge. The Science and Art Department of the Privy Council had made admirable arrangements for fostering and supporting education on the various subjects, and school boards might act with them in promoting the study of those subjects which every practical farmer required. He did not know whether it was for the Directors to point out the specialties which the gentleman to be appointed should teach, but if they had a professor whose heart was in the matter, he would be able to point out such information as would be of great advantage to farmers to know, and having ascertained that, to communicate it in an available form to the farmer. It had been said that they ought to have an agricultural college. He did not think that in the meantime there was very much hope of that being successful, but as technical education spread among the younger farmers in the country, he thought there should be a sufficient number of students who, having the elementary information, might desire to complete their education at a central college, which might be well under the charge of the gentleman to be appointed, and which would be fostered by the Society. He thought that before any appointment was made the Directors should hear the views of practical agriculturists on the subject.

The noble CHAIRMAN said that the Directors were always willing to receive any suggestions that might be made to them.

The Marquis of HUNTLY said that a meeting might be held in April in regard to the subject.

The noble CHAIRMAN said that a special general meeting might be called at any time.

Mr WILSON, Edington Mains, said he believed that he was only expressing the general feeling of the Society when he said that the position in which the Chemical Department had stood for many years had been eminently unsatisfactory to the Society at large. There could be no doubt as to the eminent qualifications of Dr Anderson for the office he held; the blame did not lie with him at all, but he was in a position in which he could not give the Society and the country the full benefit of the undoubted qualifications he possessed. It was known of late years that considerations personal to Dr Anderson practically shut the mouths of those who entertained that dissatisfaction. He knew that his own feeling was that, so long as Dr Anderson was in a state of health interfering with the discharge of the duties of the post, he (Mr Wilson) shut his mouth on the subject; but now that a calamity had come upon him—in which he desired to sympathise with Dr Anderson—now that an opening in Providence had occurred, he thought, before the Society appointed a successor, a much larger question should be entertained by the Society, and instead of simply remitting to the Directors to prepare a report against another meeting, they should remit to them to bring forward some proposition to be considered by the Society at large. He begged to move that a committee, generally representing the whole membership of the Society, should be appointed—a committee selected impartially, and in such a way as to draw out the general views of the Society—to consider the whole question. They had an opening for the Society considering how it might best apply its funds and use its influence in the promotion of the study of agriculture, and of bringing scientific knowledge to bear upon it in a far more important way than at present, and more especially with regard to the training of the rising generation. He was only stating what was well known to the whole members of the Society when he said, that any farmer, with sons growing up, who desired to give them a really liberal education with a special view to the business in hand, had it not in his power to do so in a satisfactory way at present. They had no institution such as the college at Cirencester, and the farmers in Scotland were not such as they could afford to educate their sons at such a great distance from their homes. Indeed, it was not very desirable that they should do so. They ought to have the opportunity in this city—a great educational centre as it was at present—for those who desired it, to have their sons trained in such a way as that they would be likely to do more for advancing the science and practice of agriculture than the present generation had been able to do. He thought the Highland Society would far more worthily deserve the name of the Agricultural Society of Scotland if it were doing something of that kind for training the rising generation of farmers so that they might occupy a position in advance of what their fathers had done.

Mr MASON of Belgrave Park seconded Mr Wilson's motion. He stated that, feeling great interest in the Society, it had been tried to prevent him giving his funds to it. He had a great deal of money to leave, and no relations who were deserving it, and he intended leaving it to the Society. The amount of, perhaps, L.25,000 might be got when it pleased God to take him away; but he hoped none would try to do so before his time. He never had been a Director, neither did he wish to be. He knew they had Directors totally incapacitated for that office, but he would not depart from those who acted honestly and carefully.

The Marquis of HUNTLY suggested that the Directors might appoint a small committee, and Mr Wilson another committee, say five in each, to consider the subject to which he had referred, and report. He thought that might lead to a satisfactory way of settling the whole question.

Mr DUNDAS of Arniston was under the impression that it was necessary to give notice of such a motion beforehand, in order that members might come to the meeting prepared to consider them.

Mr **Milne Home** of Wedderburn said that this was a question naturally rising out of a report laid before the meeting, and the motions made just now were for the purpose of inducing the Directors to take into consideration the views suggested in rearranging the Chemical Department. This was a subject on which he had felt extremely interested for some time past; but, being one of the Directors, he did not wish to take any part in the matter, had it not been that some of the members of the Society—themselves practical farmers—had brought the question before the Directors, and he was glad that it had come from their class to their Board. Two questions had been brought before the Directors—one was the proposal with regard to experimental farming, and the other was a proposition of a different kind referred to by Mr Wilson. It was well known that these experimental stations exist in Germany. To a large extent these experimental stations were for one purpose, and agricultural colleges for a totally different purpose. The first were intended for making discoveries, whereas agricultural colleges were merely for giving instruction in things already known. This was an important subject, not merely as a turning-point for the Highland Society, but it was a question of national importance. It so happened that Scotland was the only country in Europe, he might say in the civilised world, which had not a public institution where farmers could learn the principles of their profession. They had a college in England, they had colleges in France and Germany, and in the United States there were no less than thirty-two agricultural colleges with land attached, endowed by the State, and with from 100 to 150 professors. He had a report of the American commissioner on agriculture, who had placed at his disposal about L.50,000 a-year for the purpose of aiding agricultural instruction. In Germany there were at least 150 institutions for giving instruction in farming; and yet in this country, which was so dependent on agriculture, we had no institution of a similar kind to which young men desirous of devoting their lives to farming could go to get instruction in the science and practice of agriculture. The Highland Society was not inactive in regard to that, and he had a memorial which he was instructed to lay before the Royal Commission, sitting in London, that bore on that subject, presided over by the Duke of Devonshire. Along with the memorial, he laid before the commissioners a letter from Dr Anderson, stating what had been done in Germany, and the expenses of these experimental stations, with the view of getting them established here; but the great difficulty, of course, was the question of funds. In Germany these experimental stations were supported partly by the Government, and he thought it was a subject well worthy of being taken up by the national societies. They saw, from what had taken place in Manchester, that the manufacturing interests were taking alarm at foreign competition. They sent no fewer than thirty-four commissioners to the Vienna Exhibition to compare the progress made by foreign nations in competing with their own manufactures. The farming interest was now exposed to greater competition than others, and unless something were done for the purpose of increasing the quantity of food and the number of cattle to be raised in this country, the competition would assume most serious and alarming dimensions. It was only last year that there was an importation of cattle from New York, and preparations were being made to bring them from South America. If the farmers were not able to produce more corn and cattle than at present they would suffer in the long run.

Mr **Smith**, Whittingham, said that many, like himself, who had sons growing up about them, likely to devote their attention to agriculture and country markets, felt very deep interest on this subject; and he would only add, that it would be a very great gratification if the Directors saw their way to supply this long-felt want.

The Duke of **Buccleuch**, on referring to the rules of the Society, stated that the proposal of Mr Wilson appeared to be perfectly competent to be remitted to the Directors for their consideration, and to be disposed of at a future general meeting. There was certainly a time when it would be necessary to appoint a new professor of chemistry, and to make some new arrangements as to that office, the mode in which it was to be carried out, and how it was to be executed, so as to give information and instruction to those of mature years, as well as to those who were growing up. With reference to the observations which had fallen from Mr Wilson and Mr Milne Home as to establishments in Germany, and those large establishments in America, he supposed that they had got a more paternal government than that of this country, and had a great deal more money at their disposal than that august assembly called the House of Commons would be inclined to vote for Scotland. He doubted very much whether they would be able to soften the obdurate heart, officially obdurate, of course, of any Chancellor of the Exchequer so much as to get him to give L.50,000, or L.5000, or even L.5, towards the establishment of a college of agriculture. If they could have a college to which young men could be sent, he had no doubt it would be a very good thing. There was one in England, which, after languishing for many years in great difficulties, had been pretty well set on its legs, and he believed the education from it was very excellent. But what did he find to be the case there? A great number of young men—he knew some himself who had done so—had gone from different parts of England, where the best system of agriculture was carried on, and placed themselves under the tuition of some of the most celebrated farmers of that country, had come to Scotland to study agriculture under some of the most celebrated agriculturists here, and had afterwards gone to this college at Cirencester in England to complete the scientific part of their education. He had in mind at that moment two young men who had passed two years in Scotland for the purpose of instructing themselves in the management of sheep, who had previously passed two years in that part of England where the best agriculturists were to be found—he referred to Lincolnshire. He mentioned these things to show the difficulty they would have in establishing anything like a college here; but from what he had known in former days of the disposition of the Directors, they had always been ready to receive suggestions. He begged to suggest that a small committee should be appointed to confer with the Directors on the subject. Speaking independently from what he knew of the Board of Directors for many years, he did not believe any small committee, appointed as suggested, would be otherwise than cordially received, and their suggestions entertained.

The noble CHAIRMAN thought that if Mr Wilson would withdraw his motion in favour of the Marquis of Huntly's, there would be no difficulty in adopting the course of submitting the matter to the Directors. His object would be obtained by the appointment of a small committee in order to meet a similar committee of the Directors.

Mr WILSON said that, so that his object was essentially obtained, he was not careful about the particular method. If a committee were named to confer with the Directors, or a special portion of the Directors named to whom they might delegate the business, a well-considered report from a sufficient number was what he aimed at. The Directors might make it known that they would be glad to receive written communications in which members might express their views on the matter to be laid before them. He hoped they would take the matter up, and if they could find a well-selected committee fairly to represent the feelings of the Society, that would meet his view.

The noble CHAIRMAN—If you will name a committee or forward a list to the Secretary, they will be met by a committee of the Board of Directors, with the view of conferring on this subject, the importance of which everybody acknowledges.

Mr KINLOCH, yr. of Gilmerton, said that if the Directors would ask written suggestions from any member of the Society, they might have the suggestions sent in previous to a certain day.

Mr MILNE HOME said that if his Grace the Duke of Buccleuch's suggestion were adopted, it would put the matter in form. If it were merely left with individuals, it would not be done with the same regularity. If Mr Wilson would name four or five persons at once, it being understood that those gentlemen would draw out some communication to be laid before the Directors, that would probably meet the object in view.

Mr WILSON moved that the following committee be appointed to confer with the Directors of the Society in considering questions connected with the Chemical Department:—The Duke of Buccleuch, the Marquis of Lothian, the Marquis of Huntly, Sir Wm. Stirling-Maxwell, Lord Rosebery, Professor Crum Brown, Professor Wilson, Mr D. Cunningham, Shields, Ayrshire; Mr Hope of Bordlands; Mr Goodlet, Bolshan; Mr Irvine of Drum; Mr Maxwell of Munches; Mr Melvin, Bonnington; and Mr Ord of Muirhouselaw; and himself.

The Duke of BUCCLEUCH said he could hardly call that the sort of practical committee he had hoped to hear from Mr Wilson. He had hoped to hear the names of some gentlemen specially conversant with agriculture, which, for himself, he could not pretend to. He had a certain acquaintance with it as an amateur, but he did not pretend to have a scientific knowledge. He thought Mr Wilson would obtain that which he wished if he took a little longer time to consider the matter, instead of knocking up a number of names on the spur of the moment. Five or six really practical agriculturists would be able to submit to the Directors that which they thought was necessary for their own practical purposes.

Mr WILSON said his reason for making the committee somewhat larger was, that it was not merely the views of practical farmers that were wanted. It was a large question, bearing on the interests of the country, and there should therefore be brought out in the committee the views of persons in various ranks of life. He brought the question forward from no partisan motive, but simply to promote the interests of agriculture.

Mr DUNDAS of Arniston seconded Mr Kinloch's motion, which he understood meant that any gentleman who felt an interest in this subject should put himself in communication with the Board of Directors. He thought that that ought to meet Mr Wilson's views. He would find it very difficult to name a large committee that could be assembled in Edinburgh to work the subject steadily to an issue.

The Marquis of HUNTLY suggested that the name of Mr Forbes Irvine of Drum should be added to the committee.

Mr FORBES IRVINE stated that although not strictly a Director, as the chairman of one of the standing committees he had a seat at the Board, so that he would have the opportunity of hearing suggestions, and it would be unnecessary to name him as a member of the committee.

The noble CHAIRMAN thought the only course to be adopted now was to go on to the next business. The discussion would be quite sufficient to enable any member of the Society to communicate with the Board of Directors. There would be no difficulty in coming to some arrangement hereafter that would put the matter in a shape satisfactory to everybody.

Mr MELVIN, Bonnington, who was sitting towards the back, asked what decision was come to?

The noble CHAIRMAN—No decision is possible. There is no motion competent for this meeting, but what has passed will show any member that he will get what he wants by communicating with the Board of Directors. It would be quite possible when communications were once opened to appoint a committee.

The Marquis of HUNTLY moved that a committee be appointed to communicate with the Directors.

Sir WILLIAM GIBSON-CRAIG—There is no reason whatever for appointing a committee at all. If intimation is given by Lord Huntly and others to the Directors that they will at a certain time communicate with them on this very important subject, that is all they are required to do. To appoint a large committee, as Mr Wilson suggests, is quite unnecessary. Four, five, or six were all that were necessary.

Mr MILNE HOME said that those who had spoken could form themselves into a committee, either with Mr Wilson or the Marquis of Huntly as convener, who could communicate with the Directors and submit the views that occur. He thought the matter too important to be passed over *sub silentio*.

Mr BETHUNE of Blebo said there was a great outside public besides Mr Milne Home and Mr Wilson's committee: and he hoped some motion would be adopted in which they would not have it said that "There is no Aberdeen man," or that "There is no Western man here." There was quite enough talk on that matter. He had great faith in getting up a college, and great faith that if men were paid honestly they would get from them good honest work. He had great sympathy with the remarks of Mr Wilson and Mr Milne Home, but he thought with Mr Dundas they had no right to adopt such a motion. They were always getting into crises in Scotland—grand crises of all kinds. Land was a good deal out of fashion—about the same as it was in 1815. Get a farm cheap!—the Directors have plenty of money, you know! He was what was called a practical farmer——

The Marquis of HUNTLY spoke to order.

Mr BETHUNE—My Lord Huntly, you have been about sixteen times up! This committee can report to the general meeting; then we shall see what can please our Aberdeen men and the whole public outside, besides their friend who was to leave the L.25,000.

The Marquis of HUNTLY moved—"That it be recommended to the Directors, when considering the position of the Chemical Department, to confer with a committee of members of the Society to be elected by the Directors."

Mr BARCLAY seconded the motion, which was agreed to.

VETERINARY DEPARTMENT.—Captain TOD of Howden said—The Chair of Cattle Pathology, which was established in connection with the Edinburgh Veterinary College, has now been in existence for nearly seven sessions. When originally instituted, the Society undertook to give the professor an annual vote of L.100 for five years; the Directors now think that the Society, as the examining body, should in future withdraw all money grants in aid of professorships, in particular Veterinary Colleges, and that the advancement of the veterinary art can best be promoted by the Society annually voting a certain number of silver medals to each of the two Veterinary Colleges in Edinburgh, and to the one in Glasgow, for class competition, and a certain number of gold medals, open to all the students who come up to the April examination for the Society's veterinary certificate, to be placed at the disposal of the examiners. Of course, the gentleman who holds the professorship will be paid for the current year, which will make the period for which the grant was voted extend over seven in place of five years.

The Hon. GEORGE WALDEGRAVE LESLIE expressed a hope that the Charlier system of horse-shoeing would have a better place of exhibition at the Inverness Show than it had had on some previous occasions.

AGRICULTURAL REPORTS.—Mr WALKER of Bowland reported the premiums awarded for reports on the Science and Practice of Agriculture in 1873, and those offered for competition in 1874, which were approved of.

FORESTRY DEPARTMENT.—Professor BALFOUR reported the awards for reports in the department of Woods and Forests, as well as those offered for competition in 1874.

CONTENTS OF VOL. VI. OF THE SOCIETY'S TRANSACTIONS.—Mr IRVINE of Drum submitted the contents of the Transactions for 1874.

PROPOSED NEW HALL.—Mr MACKENZIE of Dolphinton stated that, on a report by the

Finance Committee, the Directors resolved, on 1st November 1871, to set aside L.1000 for a building fund, with a view, at some future period, of obtaining a more suitable hall for the meetings of the Society. In 1872 a further sum of L.500 was added, and the fund now amounts, with interest, to L.1598, 5s. 1d., irrespective of the value of the present building. The Directors some time since appointed a special committee on the subject, who reported that a site for a hall worthy of the Society should, if possible, be procured in a convenient locality, such as George Street or Hanover Street, although they saw no objection to extend the area between Princes Street and Queen Street, with St Andrew Street on the east and Hope Street on the west. The committee have since inspected several sites in George Street, where they think suitable accommodation could be obtained, and the Directors believe that the time has now arrived when they should ask authority from the general meeting to proceed with the selling of the present hall and offices, and acquiring premises in the New Town where a hall could be built on the ground floor. He begged to move—" That this meeting approve of the proceedings of the Directors, and authorise them to take the necessary steps for selling the present property, and acquiring premises in the New Town, where a suitable hall can be built on the ground floor."

Mr MURRAY of Dollerie seconded the motion, which was agreed to.

EPIDEMICS IN STOCK AND CROPS.—Mr MILNE HOME of Wedderburn brought before the general meeting the answer from Government (see Appendix (A), page 8) to the memorial adopted by the Society at the general meeting in June last, praying for the appointment of commissioners to investigate the causes of disease affecting the potato. The special committee on the subject recommended that no further proceedings should be taken until the result of the premium offered by the President of the English Society was made known. That was now made known, and it appeared that these essays and reports failed to give any new information on the subject. Most people expected that would be the result. They could furnish only information of what was known; and their object was to find what was not known. A proposition made by the English Society would come before the Directors of this Society at their meeting in February. He was glad to find that the English Society had appointed a committee of investigation, at an expense of L.500. They also expressed the hope that the Highland Society would join with them in carrying on the investigation.

ORDNANCE SURVEY.—The Duke of BUCCLEUCH said he had been requested to move the adoption of the following memorial:—

"To the Right Honourable the Commissioners of Her Majesty's Works, the memorial of the Highland and Agricultural Society of Scotland, incorporated by Royal Charter,—

" Sheweth—That your memorialists have watched with interest the progress of the Ordnance Survey of Scotland, and have at different periods considered it to be their duty to represent to Her Majesty's Government the public feeling in Scotland with reference to that important national undertaking: That the survey of Scotland has hitherto been conducted as a separate branch of the survey of the United Kingdom, and ought to be so carried on until its termination: That your memorialists have learned with much regret that it is contemplated to postpone the completion of the survey in Scotland on the 25-inch scale, and they believe that if this intention is carried out, the survey will be left unfinished for an indefinite number of years: That the work to be done on the 25-inch scale, though small in amount, and which a very few years will suffice to complete, is of an important character, comprising the counties of Fife, Edinburgh, Haddington, Kirkcudbright, and Wigtown, the first three of these counties being important mineral districts: That your memorialists would earnestly urge that until the survey of Scotland has been completed, a fair share of the Parliamentary grant ought to be assigned to it. May it therefore please your right hon. Board to take the premises into consideration, and to carry out with vigour and expedition the survey of Scotland not yet completed.—Signed in name and by authority of a general meeting held at Edinburgh on the 21st day of January 1874."

His Grace said that this was a subject which had for many years occupied the attention of the Society. It was evident that whenever there was a pressure from without, Scotland had been shoved to the wall. We were so very far north, and lived in so cold a climate, that it did not seem to matter how far we were put out in the cold. When there was a demand for a survey for Ireland, the cry was, " Oh, suspend the Scottish survey." At present the English county gentlemen were finding out that the old 1-inch survey was absurd and of very little use, and they were wasting a great deal more money to have a new 1-inch survey. It seemed that most of Scotland—at least the agricultural portion—had been surveyed at the rate of 25 inches to the mile. It was of great importance that they should have an accurate survey in regard to the minerals, and to have these accurately put down. By putting a stop to the survey they would lose all their experienced staff, both engineers and labourers, connected with it.

Mr **Milne Home** said it was a most insufferable grievance that the Government, after having given the means of carrying out the survey in Scotland, should actually take them away. The Government for a number of years past had been carrying on the survey, and they suddenly withdrew it for the purpose of throwing away the money or applying it to other purposes.

The Hon. **George Waldegrave Leslie** said that at the last meeting of the Commissioners of Supply of the county of Fife, he had the honour of moving a resolution on the subject, which was unanimously carried; and a motion correlatively to the one submitted by His Grace was sent to Mr Adam, the Commissioner of Works, who, he hoped, would be favourable to the case. (Applause.)

Steam Cultivation.—Professor **Wilson** submitted the report on this subject, in which it was stated that the interest in the country regarding steam cultivation was increasing, and that it was in contemplation to hold a competition early in autumn next, for which arrangements were authorised to be made.

The Hon. **George Waldegrave Leslie** moved a vote of thanks to the noble Chairman for his very able conduct in the chair, as he had guided the Society through a busy and rather boisterous day with very great success indeed.

The proceedings then terminated.

PREMIUMS AWARDED BY THE SOCIETY IN 1873-74.

I.—REPORTS, 1874.

AGRICULTURAL.

1.	Henry Evershed, Hellingly, Hawkhurst, Sussex, for a Report on the Agriculture of the Islands of Shetland,		L.20	0	0
2.	Robert Scot Skirving, Camptoun, Drem, for a Report on the Agriculture of the Islands of Shetland,		10	0	0
3.	Thomas MacLelland, North Balfern, Kirkinner, Wigtownshire, for a Report on the Agriculture of the Stewartry of Kirkcudbright and Wigtownshire,		30	0	0
4.	Thomas Farrall, Dovenby, Cockermouth, Cumberland, for a Report on the Comparative Advantages of applying Manure to the Stubble in Autumn, or in the Drills in Spring,		20	0	0
5.	Alfred Harwood, Belstead Hall, Ipswich, Suffolk, for a Report on Experiments for ascertaining the actual addition of Weight to Growing or Fattening Stock by the use of different kinds of Food,		20	0	0
6.	George Bruce, Keig, Aberdeenshire, for a Report on the Comparative and General Qualities for Use and Keeping of the different kinds of Swedish, Yellow, and White Turnips, generally used in Field Culture,		10	0	0
7.	Thomas Farrall, Dovenby, Cockermouth, Cumberland, for a Report on the West Highland Breed of Cattle, and the means that have been used or might be used for its Conservation and Improvement,	The Gold Medal,	10	0	0
8.	Alexander Mann, M.A., Rothiemay, Banffshire, for a Report on Agricultural Education,	The Medium Gold Medal,	6	2	0
9.	John M'Culloch, Agnew Crescent, Stranraer, for a Report on the Influence of Geological Formation on the Health and Development of Sheep,	The Medium Gold Medal,	6	2	0
10.	John M'Millan, Halketleaths, Castle-Douglas, for a Report on the Influence of Geological Formation on the Health and Development of Sheep,	The Medium Gold Medal,	6	2	0

FORESTRY.

11.	Lewis Bayne, Forester, Kinmel Park, Abergele, North Wales, for a Report on the General Management of Plantations,	Plate, value	10	0	0
12.	Alexander Smith, C.E. and Surveyor, Aberdeen, for a Report on the Woods, Forests, and Forestry in the County of Aberdeen,		10	0	0
13.	J. E. Brown, Craigmill, Stirling, for a Report on the Coniferous Trees found in the Forests of California,		5	0	0
14.	Andrew Gilchrist, Forester, Urie, Stonehaven, for a Report on Successful Planting on Exposed Sterile Tracts,		5	0	0
15.	Robert Hutchison of Carlowrie, Kirkliston, for a Report on the most Profitable Varieties of Trees for Planting with a view to early Realisation and Profit, especially Willows and Poplars,	Plate, value	5	0	0
16.	Christopher Young Michie, Forester, Cullen House, Cullen, for a Report on the Effects of Wet as compared with Dry Seasons on Woods, Forests, Moor, Game, &c.,		5	0	0
17.	Captain Campbell, F.R.G.S., Staff Corps, Deputy-Conservator of Forests, Madras, for a Report on Forest Management in Germany, Austria, &c.,	The Medium Gold Medal,	6	2	0
18.	John B. Webster, Forester, Churchill, Verner's Bridge, Moy, Ireland, for a Report on the Growth and Management of Scotch Fir Forests,	Plate, value	5	0	0
			L.189	8	0

II.—STIRLING SHOW, 1873.

CLASS I.—CATTLE.

SHORTHORN.

SECTION 1. BULLS calved before 1st January 1871.

1.	Robert Coulson, Coastley, Hexham, "Earl of Derwent,"		L.20	0	0
2.	Samuel Stewart, Sandhole, Fraserburgh, "Alliance,"		10	0	0
3.	Walter Scott, Glendronach, Huntly, "Jeweller,"	Medium Silver Medal,	0	10	6
4.	Sir William Stirling Maxwell of Keir, Bart., Dunblane, "Red Duke,"	Minor Silver Medal,	0	6	0
	Breeder of Best Bull—T. Marshall, Howes, Annan,	Silver Medal,	0	16	0
		Carry forward,	L.31	12	6

		Brought forward,	L.31	12	6

SECTION 2. BULLS calved after 1st January 1871.

1.	William Lambert, Elrington Hall, Haydon Bridge, "Heatherbred Lad,"		20	0	0
2.	Ralph Stark, Camelon House, Falkirk, "Brideaman,"		10	0	0
3.	Sir William Stirling Maxwell of Keir, Bart., Dunblane, "Keir Butterfly 9th,"	Medium Silver Medal,	0	10	6
4.	William S. Marr, Upper Mill, Tarves, "Young Englishman,"	Minor Silver Medal,	0	6	0

SECTION 3. BULLS calved after 1st January 1872.

1.	Alexander Buchanan, Whitehouse, Stirling, "Bywell,"		10	0	0
2.	William S. Marr, Upper Mill, Tarves, "Young Heir,"		5	0	0
3.	James Christie, Bankend, Stirling, "Star of the Forth,"	Medium Silver Medal,	0	10	6
4.	William Lambert, Elrington Hall, Haydon Bridge, "Orphan Boy,"	Minor Silver Medal,	0	6	0

First Prize Cows at former Shows—Exhibited for Medium Gold Medal.

	Kelso, 1872, when the property of the present Exhibitor—The Duke of Buccleuch and Queensberry, K.G., Dalkeith Park, Dalkeith, "Young Cherry,"	Medium Gold Medal,	6	2	0

SECTION 4. COWS of any age.

1.	A. H. Browne, Bank House, Acklington, "Primrose,"		15	0	0
2.	Sir William Stirling Maxwell of Keir, Bart., Dunblane, "Princess Henrietta,"		8	0	0
3.	The Duke of Buccleuch and Queensberry, K.G., Dalkeith Park, Dalkeith, "Queen of the Lothians,"	Medium Silver Medal,	0	10	6
4.	A. H. Browne, Bank House, Acklington, "Daisy,"	Minor Silver Medal,	0	6	0

SECTION 5. HEIFERS calved after 1st January 1871.

1.	William A. Mitchell, Auchnagathle, Whitehouse, Aberdeen, "Hawthorn,"		10	0	0
2.	William S. Marr, Upper Mill, Tarves, "Bride 3d,"		5	0	0
3.	John Outhwaite, Bainesse, Catterick, "Baroness Conyers,"	Medium Silver Medal,	0	10	6
4.	Her Majesty the Queen, The Prince Consort's Shaw Farm, Windsor, "Alice,"	Minor Silver Medal,	0	6	0

SECTION 6. HEIFERS calved after 1st January 1872.

1.	Her Majesty the Queen, The Prince Consort's Shaw Farm, Windsor, "Carolina 4th,"		8	0	0
2.	A. H. Browne, Bank House, Acklington, "Oxford Beauty 2d,"		4	0	0
3.	William S. Marr, Upper Mill, Tarves, "Princess Royal 13th,"	Medium Silver Medal,	0	10	6
4.	William Lambert, Elrington Hall, Haydon Bridge, "Matchless,"	Minor Silver Medal,	0	6	0

POLLED ANGUS OR ABERDEEN.

First Prize Bulls at former Shows—Exhibited for Medium Gold Medal.

	Perth, 1871, when the property of the present Exhibitor—Sir George Macpherson Grant of Ballindalloch, Bart., Ballindalloch, "Juryman,"	Plate, value	5	0	0
	Kelso, 1872, when the property of the present Exhibitor—Sir Thomas Gladstone of Fasque, Bart., Laurencekirk, "Adrian,"	Medium Gold Medal,	6	2	0

SECTION 7. BULLS calved before 1st January 1871.

1.	T. Leslie Melville Cartwright, Melville House, Ladybank, "Colonel of Castle Fraser,"		20	0	0
2.	George Brown, Westertown, Fochabers, "Duke of Perth,"		10	0	0
3.	Robert Walker, Monthletton, Banff, "Hampton,"	Medium Silver Medal,	0	10	6
4.	The Earl of Fife, K.T., Duff House, Banff, "John Bright,"	Minor Silver Medal,	0	6	0
	Breeder of best Bull—James Leslie, The Thorn, Blairgowrie,	Silver Medal,	0	16	0

SECTION 8. BULLS calved after 1st January 1871.

1.	A. Bowie, Mains of Kelly, Arbroath, "Gainsborough,"		20	0	0
2.	Sir George Macpherson Grant of Ballindalloch, Bart., Ballindalloch, "Scotsman,"		10	0	0
3.	W. Dingwall Fordyce, M.P., Brucklay Castle, Aberdeen, "Black Prince of Wester Fowlis,"	Medium Silver Medal,	0	10	6
4.	Alexander Paterson, Mulben, Keith, "Elgin,"	Minor Silver Medal,	0	6	0

SECTION 9. BULLS calved after 1st January 1872.

1.	The Earl of Fife, K.T., Duff House, Banff, "Altanour,"		10	0	0
2.	William James Tayler, Rothiemay House, Huntly, "Nonsuch,"		5	0	0
3.	James Scott, Easter Tulloch, Stonehaven, "Bluebeard,"	Medium Silver Medal,	0	10	6
4.	William M'Combie, M.P., Tillyfour, Aberdeen, "Shah,"	Minor Silver Medal,	0	6	0
		Carry forward,	L.226	4	6

	Brought forward,	L.226	4	6

First Prize Cows at former Shows—Exhibited for Medium Gold Medal.

Perth, 1871, when the property of the present Exhibitor—Sir George Macpherson Grant of Ballindalloch, Ballindalloch, "Eisa,"	Plate, value	5	0	0
Kelso, 1872, when the property of the present Exhibitor—William M'Combie, M.P., Tillyfour, Aberdeen, "Charmer,"	Medium Gold Medal,	6	2	0

Section 10. COWS of any age.

1. Sir George Macpherson Grant of Ballindalloch, Bart., Ballindalloch, "Bertha,"		15	0	0
2. The Earl of Fife, K.T., Duff House, Banff, "Corriemulzie,"		8	0	0
3. Robert Walker, Montbletton, Banff, "Lady Ida,"	Medium Silver Medal,	0	10	6
4. The Marquis of Huntly, Aboyne Castle, Aboyne, "Duchess 4th,"	Min. Silv. Medal,	0	6	0

Section 11. HEIFERS calved after 1st January 1871.

1. William James Tayler, Rothiemay House, Huntly, "Kate 2d,"		10	0	0
2. William M'Combie, M.P., Tillyfour, Aberdeen, "Pride of Alford,"		5	0	0
3. The Earl of Fife, K.T., Duff House, Banff, "Heather Blossom,"	Medium Silver Medal,	0	10	6
4. Sir George Macpherson Grant of Ballindalloch, Ballindalloch, "Eva,"	Minor Silver Medal,	0	6	0

Section 12. HEIFERS calved after 1st January 1872.

1. William M'Combie, of Easter Skene, Skene, Aberdeenshire, "Young Grizzle,"		8	0	0
2. William M'Combie, M.P., Tillyfour, Aberdeen, "Lilias,"		4	0	0
3. The Earl of Fife, K.T., Duff House, Banff, "Innes,"	Medium Silver Medal,	0	10	6
4. The Earl of Fife, K.T., Duff House, Banff, "Kate 3d,"	Minor Silver Medal,	0	6	0

GALLOWAY.

First Prize Bulls at former Shows—Exhibited for Medium Gold Medal.

Perth, 1871, when the property of the present Exhibitor—James Graham, Parcelstown, Longtown, "Willie of Westburnflat,"		5	0	0

Section 13. BULLS calved before 1st January 1871.

1. James Cunningham, Tarbreoch, Dalbeattie, "Pretender,"		20	0	0
2. Robert Jardine, M.P., Castlemilk, Lockerbie, "Cunningham,"		10	0	0
3. Richard Hyslop, Denton Hall, Low Row, Carlisle, "Bob,"	Medium Silver Medal,	0	10	6
4. J., S., & A. Nivison, Lairdlaugh, Dalbeattie, "Brigham Young,"	Minor Silver Medal,	0	6	0
Breeder of Best Bull—John Underwood, Crofts, Castle Douglas,	The Silver Medal,	0	16	0

Section 14. BULLS calved after 1st January 1871.

1. The Duke of Buccleuch and Queensberry, K.G., Drumlanrig Castle, Thornhill, "Black Prince of Drumlanrig,"		20	0	0
2. Maxwell Clark, Culmain, Crocketford, Dumfries, "Mangerton,"		10	0	0

Section 15. BULLS calved after 1st January 1872.

1. George Graham, Cubbyhill, Longtown, "Forest King,"		10	0	0
2. James Jardine Paterson of Balgray, Lockerbie, "Brave Charlie,"		5	0	0
3. David Hardie, Priesthaugh, Hawick, "Dandy Jim,"	Medium Silver Medal,	0	10	6

First Prize Cows at former Shows—Exhibited for Medium Gold Medal.

Perth, 1871, when the property of James Cunningham, Tarbreoch, Dalbeattie—The Duke of Buccleuch and Queensberry, K.G., Drumlanrig Castle, Thornhill, "Jean,"	Medium Gold Medal,	6	2	0

Section 16. COWS of any age.

1. The Duke of Buccleuch and Queensberry, K.G., Drumlanrig Castle, Thornhill, "Louisa 2d,"		15	0	0
2. The Duke of Buccleuch and Queensberry, K.G., Drumlanrig Castle, Thornhill, "Louisa,"		8	0	0
3. James Cunningham, Tarbreoch, Dalbeattie, "Music,"	Medium Silver Medal,	0	10	6
4. The Duke of Buccleuch and Queensberry, K.G., Drumlanrig Castle, Thornhill, "Handsome,"	Minor Silver Medal,	0	6	0
	Carry forward,	L.401	17	6

		Brought forward,	L.401	17	6

SECTION 17. HEIFERS calved after 1st January 1871.

1.	The Duke of Buccleuch and Queensberry, K.G., Drumlanrig Castle, Thornhill, "Melantho,"		10	0	0
2.	James Cunningham, Tarbreoch, Dalbeattie, "Favourite,"		5	0	0
3.	The Duke of Buccleuch and Queensberry, K.G., Drumlanrig Castle, Thornhill, "Mellona,"	Medium Silver Medal,	0	10	6
4.	James Graham, Parcelstown, Longtown, "Hermione 6th,"	Minor Silver Medal,	0	6	0

SECTION 18. HEIFERS calved after 1st January 1872.

	James Cunningham, Tarbreoch, Dalbeattie, "Alice Maud,"		8	0	0
2.	James Cunningham, Tarbreoch. Dalbeattie, "Beatrice,"		4	0	0
3	W. & J. Shennan, Balig, Kirkcudbright, "Mary 2d,"	Medium Silver Medal,	0	10	6
4.	W. & J. Shennan, Balig, Kirkcudbright, "Jenny Norman 3d,"	Minor Silver Medal,	0	6	0

AYRSHIRE.

First Prize Bulls at former Shows—Exhibited for Medium Gold Medal.

Perth, 1871, when the property of James Wilson, Boghall, Houston—Duncan C. Willison, Dalpeddar, Sanquhar, "President,"	Plate, value	5	0	0
Kelso, 1872, when the property of the present Exhibitor—Sir Michael R. Shaw Stewart of Ardgowan, Bart., Inverkip, "Underheugh,"	Medium Gold Medal,	6	2	0

SECTION 19. BULLS calved before 1st January 1871.

1.	Thomas Ballantyne, Netherton, East Kilbride, "White Butterfly,"		20	0	0
2.	William Young, Waterbank, Carmunnock, "Eagle,"		10	0	0
3	John Anderson, Smithstown, Kilsyth, "Norman,"	Medium Silver Medal,	0	10	6
4.	Sir Michael R. Shaw Stewart of Ardgowan, Bart., Inverkip, "Lofty,"	Minor Silver Medal,	0	6	0
	Breeder of Best Bull—William Paterson, Huntleybridge, East Kilbride,	The Silver Medal,	0	16	0

SECTION 20. BULLS calved after 1st January 1871.

1.	Duncan Keir, Bucklyvie, "Prince Charlie,"		20	0	0
2.	David Young, Auchenrivoch, Kilsyth,		10	0	0
3.	Sir Michael R. Shaw Stewart of Ardgowan, Bart., Inverkip, "Bankfoot,"	Medium Silver Medal,	0	10	6
4.	William Craig, Crutherland, East Kilbride, "Prince,"	Minor Silver Medal,	0	6	0

SECTION 21. BULLS calved after 1st January 1872.

1.	Lawrence Drew, Merryton, Hamilton,		10	0	0
2.	John Fleming, Meadowbank Cottage, Strathaven, "Champion,"		5	0	0
3	Thomas Ballantyne, Netherton, East Kilbride, "Albion,"	Medium Silver Medal,	0	10	6
4.	John Mitchell, Cairn, Mearns, "The General,"	Minor Silver Medal,	0	6	0

SECTION 22. COWS in Milk of any age.

1.	Robert Wilson, Forehouse, Kilbarchan, "Hornie,"		15	0	0
2.	John Fleming, Meadowbank Cottage, Strathaven, "Heather Bloom,"		8	0	0
3.	Lawrence Drew, Merryton, Hamilton,	Medium Silver Medal,	0	10	6
4.	George Pender, Dumbreck, Kilsyth, "Paisley,"	Minor Silver Medal,	0	6	0

First Prize Cows at former Shows—Exhibited for Medium Gold Medal.

Perth, 1871, when in Milk, and the property of Gabriel Dunlop, Castlefarm, Stewarton—The Duke of Buccleuch and Queensberry, K.G., Drumlanrig Castle, Thornhill, "Maid of Perth," (late "Betty,")	Medium Gold Medal,	6	2	0
Kelso, 1872, when in Milk, and the property of John Meikle, Seafield, Bathgate—John M. Martin, Auchenfroe, Cardross, "Kelso,"	Plate, value	5	0	0
Kelso, 1872, when in Calf, and the property of the present Exhibitor—John M. Martin, Auchenfroe, Cardross, "Lily,"	Plate, value	5	0	0

SECTION 23. COWS in Calf of any age, or Heifers in Calf, calved before 1st January 1871.

1.	John Stewart, Burnside Cottage, Strathaven, "Beauty,"		15	0	0
2.	John Fleming, Meadowbank Cottage, Strathaven, "Chance,"		8	0	0
3.	Robert Wilson, Forehouse, Kilbarchan, "Kirsty,"	Medium Silver Medal,	0	10	6
4.	The Duchess Dowager of Athole, Dunkeld, "Mary 2d,"	Minor Silver Medal,	0	6	0
		Carry forward,	L.583	13	0

Brought forward, L.583 13 0

SECTION 24. HEIFERS calved after 1st January 1871.

1.	George Pender, Dumbreck, Kilsyth, "Flora,"		10	0	0
2.	The Duke of Buccleuch and Queensberry, K.G., Drumlanrig, "Duchess 3d,"		5	0	0
3.	David Fleming, Avon Mills, Hamilton, "Avon,"	Medium Silver Medal,	0	10	6
4.	The Duke of Buccleuch and Queensberry, K.G., Drumlanrig Castle, Thornhill, "Lady Mary,"	Minor Silver Medal,	0	6	0

SECTION 25. HEIFERS calved after 1st January 1872.

1.	The Duke of Buccleuch and Queensberry, K.G., Drumlanrig Castle, Thornhill, "Myrtle,"		8	0	0
2.	George Pender, Dumbreck, Kilsyth, "Glasgow,"		4	0	0
3.	David Tweedie, Castle Crawford, Abington, "Daintie,"	Medium Silver Medal,	0	10	6
4.	John Stewart, Burnside Cottage, Strathaven, "Maggie,"	Minor Silver Medal,	0	6	0

HIGHLAND.

First Prize Bulls at former Shows—Exhibited for Medium Gold Medal.

Perth, 1871, when the property of the present Exhibitor—John Stewart, Duntulm, Portree, "Skeanoch Og,"	Plate, value	5	0	0
Kelso, 1872, when the property of the present Exhibitor—The Hon. Lady Menzies, Rannoch Lodge, Pitlochrie,	Medium Gold Medal,	6	2	0

SECTION 26. BULLS calved before 1st January 1870.

1.	Donald M'Intyre, Tighnablair, Comrie, "Gillie Dubh,"		20	0	0
	Breeder of Best Bull—John Stewart, Duntulm, Portree,	Silver Medal,	0	16	0

SECTION 27. BULLS calved after 1st January 1870.

1.	Representatives of the late Robert Peter, Urlar, Aberfeldy, "Gille Dubh,"		20	0	0
2.	The Duke of Athole, K.T., Blair Castle, Blair Athole, "Sgiathanach."		10	0	0
3.	Alex. S. Stevenson, Auchenneilan, Ford, Lochgilphead, "Bruce,"	Medium Silver Medal,	0	10	6

SECTION 28. BULLS calved after 1st January 1871.

1.	John Stewart, Bochastle, Callander, "Donachach Dubh,"		10	0	0
2.	The Duke of Athole, K.T., Blair Castle, Blair Athole, "Gille Dubh,"		5	0	0
3.	Donald M'Laren, Corrychrone, Callander, "Gille Buidhe,"	Medium Silver Medal,	0	10	6
4.	The Earl of Seafield, Castle Grant, Grantown, "Crinan,"	Minor Silver Medal,	0	6	0

First Prize Cows at former Shows—Exhibited for Medium Gold Medal.

Perth, 1871, when the property of the present Exhibitor—The Duke of Athole, K.T., Blair Castle, Blair Athole, "Young Queen,"	Medium Gold Medal,	6	2	0
Kelso, 1872, when the property of the present Exhibitor—John Stewart, Duntulm, Portree, "Guanach Og,"	Plate, value	5	0	0

SECTION 29. COWS of any age.

1.	John Stewart, Bochastle, Callander, "N'odhar,"		15	0	0
2.	John Stewart, Bochastle, Callander, "Raibhach Mhalachach,"		8	0	0
3.	The Duke of Athole, K.T., Blair Castle, Blair Athole, "Anne Og,"	Medium Silver Medal,	0	10	6
4.	The Earl of Seafield, Castle Grant, Grantown, "Countess,"	Minor Silver Medal,	0	6	0

SECTION 30. HEIFERS calved after 1st January 1870.

1.	John Stewart, Duntulm, Portree, "Tarrgal,"		10	0	0
2.	The Duke of Athole, K.T., Blair Castle, Blair Athole, "Bean Og,"		5	0	0
3.	The Duke of Athole, K.T., Blair Castle, Blair Athole, "Queen,"	Medium Silver Medal,	0	10	6
4.	Representatives of the late Robert Peter, Urlar, Aberfeldy, "Mhairi Odhar,"	Minor Silver Medal,	0	6	0

SECTION 31. HEIFERS calved after 1st January 1871.

1.	The Duke of Athole, K.T. Blair Castle, Blair Athole, "Young Jessie,"		8	0	0
2.	The Earl of Seafield, Castle Grant, Grantown, "Craigellachie,"		4	0	0
3.	The Earl of Seafield, Castle Grant, Grantown, "Kate,"	Medium Silver Medal,	0	10	6
4.	John Stewart, Duntulm, Portree, "Sholach,"	Minor Silver Medal,	0	6	0

Carry forward, L.754 2 6

Brought forward, L.754 2 6

FAT STOCK.

SECTION 32. SHORTHORN OXEN calved after 1st January 1870.

1.	Richard Heath Harris, Earnhill, Forres, "V.C.,"		5	0	0

SECTION 33. SHORTHORN OXEN calved after 1st January 1871.

1.	Robert Bruce. Newton of Struthers, Forres,	Plate, value	5	0	0
2.	Sir William Gordon Gordon Cumming, of Altyre, Bart., Forres,	Silver Medal,	0	16	0

SECTION 34. HIGHLAND OXEN calved after 1st January 1869.

1.	Sir William Gordon Gordon Cumming, of Altyre, Bart., Forres,	Plate, value	5	0	0
2.	Charles Morrison of Islay, Bridgend, Islay, "Cladville,"	Silver Medal,	0	16	0
3.	Charles Morrison of Islay, Bridgend, Islay, "Charlie,"	Medium Silver Medal,	0	10	6
4.	Lady John Scott Spottiswoode, of Spottiswoode, Lauder, "Canmore,"	Minor Silver Medal,	0	6	0

SECTION 35. HIGHLAND OXEN calved after 1st January 1870.

1.	Sir William Gordon Gordon Cumming, of Altyre, Bart., Forres,	Plate, value	5	0	0
2.	George Stirling Home Drummond of Blair-Drummond, Stirling,	The Silver Medal,	0	16	0
3.	The Earl of Seafield, Castle Grant, Grantown, "Jock,"	Medium Silver Medal,	0	10	6
4.	George Stirling Home Drummond of Blair-Drummond, Stirling,	Minor Silver Medal,	0	6	0

SECTION 36. OXEN of any other Pure or Cross Breed calved after 1st January 1870.

1.	Richard Heath Harris, Earnhill. Forres, "Banker,"		5	0	0
2.	George Downie, Balcomie, Crail,	The Silver Medal,	0	16	0
3.	John Gordon of Cluny Castle, Aberdeen,	Medium Silver Medal,	0	10	6
4.	George Downie, Balcomie, Crail,	Minor Silver Medal,	0	6	0

SECTION 37. OXEN of any other Pure or Cross Breed calved after 1st January 1871.

1.	Sir William Gordon Gordon Cumming, of Altyre, Bart., Forres,	Plate, value	5	0	0
2.	Robert Husband, Gellet, Dunfermline,	The Silver Medal,	0	16	0
3.	Robert Husband, Gellet, Dunfermline,	Medium Silver Medal,	0	10	6

SECTION 38. CROSS-BRED HEIFERS calved after 1st January 1870.

1.	Matthew Edwards, Hilton, Alloa,	Plate, value	5	0	0

SECTION 39. CROSS-BRED HEIFERS calved after 1st January 1871.

1.	William A. Mitchell, Auchnagathle, Whitehouse, Aberdeen, "Dolly Varden,"	Plate, value	5	0	0
2.	Bryce Wright, Dowhill, Girvan, "Bessie Lee,"	Silver Medal,	0	16	0
3.	Robert Bruce, Newton of Struthers, Forres,	Medium Silver Medal,	0	10	6
4.	John M'Dougall, Goodlyburn, Perth, "Fair Maid of Perth,"	Minor Silver Medal,	0	6	0

EXTRA CATTLE.

The following were highly commended:—

Alderney Cow, "Cockade," Sir John Marjoribanks of Lees, Bart.,	The Silver Medal,	0	16	0
Kerry Bull, "St Patrick," C. Brinsley Marlay, Belvedere House, Mullingar,	The Silver Medal,	0	16	0

The following were commended:—

Kerry Bull, "Rory of the Hills," C. Brinsley Marlay, Belvedere House, Mullingar,	Medium Silver Medal,	0	10	6
Kerry Heifer, "Lady Kathleen," C. Brinsley Marlay, Belvedere House, Mullingar,	Medium Silver Medal,	0	10	6

L.805 8 0

CLASS II.—HORSES

FOR AGRICULTURAL PURPOSES.

First Prize Stallions at former Shows—Exhibited for Medium Gold Medal.

Perth, 1871, when the property of Peter M'Robbie, Sunnyside, Aberdeen—Thomas Statter, Stand Hall, Whitefield, Manchester, "Black Prince,"	Plate, value	5	0	0
Kelso, 1872, when the property of David Riddell, Kilbowie, Duntocher—Lawrence Drew, Merryton, Hamilton, "Prince of Wales,"	Medium Gold Medal,	6	2	0

Carry forward, L.11 2 0

	Brought forward,	L.11	2	0

SECTION 1. STALLIONS foaled before 1st January 1870.

1. Alexander Galbraith, Croy Cunningham, Killearn, "Topsman,"		30	0	0
2. Samuel Clark, Manswrae, Bridge of Weir, "Young Lorne,"		15	0	0
3. Peter Crawford, Dumgoyack, Strathblane, "Young Scotsman,"	Medium Silver Medal,	0	10	6
4. David Riddell, Kilbowie, Duntocher, "Banker,"	Minor Silver Medal,	0	6	0
Breeder of Best Stallion—George Wilson, Whiteside, Alford, N.B.,	The Silver Medal,	0	16	0

SECTION 2. ENTIRE COLTS foaled after 1st January 1870.

1. Robert M'Kean, Lumloch, Bishopbriggs, "Prince of Kilbride,"		20	0	0
2. David Riddell, Kilbowie, Duntocher, "Prince Arthur,"		10	0	0
3. David Riddell. Kilbowie, Duntocher, "Time of Day,"	Medium Silver Medal,	0	10	6
4. Peter Crawford, Dumgoyack, Strathblane, "General Williams,"	Minor Silver Medal,	0	6	0

SECTION 3. ENTIRE COLTS foaled after 1st January 1871.

1. Peter Crawford, Dumgoyack, Strathblane, "Quality,"		15	0	0
2. Archibald Yuill, 33 Cathedral Street, Glasgow, "Young Prince of Wales,"		8	0	0
3. Robert Andrew, Allans, Paisley, "Defiance,"	Medium Silver Medal,	0	10	6
4. James Kerr, Lochend, Kilbirnie, "Young Champion,"	Minor Silver Medal,	0	6	0

SECTION 4. ENTIRE COLTS foaled after 1st January 1872.

1. Samuel Clark, Manswrae, Bridge of Weir,		10	0	0
2. Sir William Stirling Maxwell of Keir, Bart., Dunblane, "Darnley,"		5	0	0
3. Robert Weir, Brownhill, Carnwath, "Victor,"	Medium Silver Medal,	0	10	6
4. Peter Crawford, Dumgoyack, Strathblane, "Prince Charlie,"	Minor Silver Medal,	0	6	0

SECTION 5. MARES (with Foal at foot) foaled before 1st January 1870.

1. George Knox, Polnoon Lodge, Eaglesham, "Rosie,"		20	0	0
2. Lawrence Drew, Merryton, Hamilton, "Darling,"		10	0	0
3. David Riddell, Kilbowie, Duntocher, "Maggie,"	Medium Silver Medal,	0	10	6
4. W. A. MacLachlan of Auchentroig, Balfron, "Maggie,"	Minor Silver Medal,	0	6	0

First Prize Mares at former Shows—Exhibited for Medium Gold Medal.

Kelso, 1872, when with foal at foot, and the property of the present Exhibitor—R. M. Buchanan, Livingston Mill, Mid-Calder, "Missie No. 2,"	Plate, value	5	0	0

SECTION 6. MARES (in Foal) foaled before 1st January 1870.

1. Sir William Stirling Maxwell of Keir, Bart., Dunblane, "Rose,"		15	0	0
2. Ralph Stark, Camelon House, Falkirk, "Bell,"		8	0	0
3. Lawrence Drew, Merryton, Hamilton,	Medium Silver Medal,	0	10	6
4. Lawrence Drew, Merryton, Hamilton, "London Maggie,"	Minor Silver Medal,	0	6	0

SECTION 7. FILLIES foaled after 1st January 1870.

1. Archibald Johnston, Lochburn, Maryhill, "Maggie,"		10	0	0
2. David Riddell, Kilbowie, Duntocher, "Rosie,"		5	0	0
3. George Knox, Polnoon Lodge, Eaglesham, "Maggie,"	Medium Silver Medal,	0	10	6
4. Sir William Stirling Maxwell of Keir, Bart., Dunblane, "Young Maggie,"	Minor Silver Medal,	0	6	0

SECTION 8. FILLIES foaled after 1st January 1871.

1. William Craig, Craig Villa, New Cumnock, "Maggie,"		8	0	0
2. Sir William Stirling Maxwell of Keir, Bart., Dunblane, "Young Kate,"		4	0	0
3. Lawrence Drew, Merryton, Hamilton,	Medium Silver Medal,	0	10	6
4. R. M. Buchanan, Livingston Mill, Mid-Calder, "Kate,"	Minor Silver Medal,	0	6	0

SECTION 9. FILLIES foaled after 1st January 1872.

1. Wm. H. Hardie, Borrowstown Mains, Linlithgow, "Ranée,"		6	0	0
2. The Earl of Strathmore, Glamis Castle, Glamis, "Bess,"		3	0	0
3. James M'Nab, Burnside, Menstrie, "Princess,"	Medium Silver Medal,	0	10	6
4. Lawrence Drew, Merryton, Hamilton,	Minor Silver Medal,	0	6	0

SECTION 10. DRAUGHT GELDINGS foaled after 1st January 1870.

1. Robert M'Kean, Lumloch, Bishopbriggs, "Bob,"		5	0	0
2. Alexander Graham, Blackwater, Kilmalcolm, "Prince Charlie,"	The Silver Medal,	0	16	0
3. Thomas Leishman, Meiklewood, Gargunnock, "Charlie,"	Medium Silver Medal,	0	10	6
4. James Love, 12 East Quay Lane, Greenock, "Bob,"	Minor Silver Medal,	0	6	0
	Carry forward,	L.232	19	0

Brought forward, L.232 19 0

SECTION 11. DRAUGHT GELDINGS foaled after 1st January 1871.

1.	Robert Weir, Brownhill, Carnwath, "Campsie,"		5	0	0
2.	Peter Turner, Mannerston, Linlithgow, "Black Charlie,"	The Silver Medal,	0	16	0
3.	David Buchanan, Garscadden Mains, New Kilpatrick, "Charlie,"	Medium Silver Medal,	0	10	6

HUNTERS AND ROADSTERS.

SECTION 12. BROOD MARES, suitable for field (in foal or with foal at foot), foaled before 1st January 1869.

1.	James Stewart, Heathfield, Irvine, "Miss Kelly,"		20	0	0
2.	George Beveridge, Kirkton, Auchtertool, Kirkcaldy, "Polly Perkins,"		10	0	0
3.	Robert Stark, Kirkcaldy, "Eva,"	Medium Silver Medal,	0	10	6

SECTION 13. YELD MARES or GELDINGS suitable for field, foaled before 1st January 1869.

1.	J. T. Hutchison, 28 Royal Terrace, Edinburgh, Gelding, "Moltke,"		20	0	0
2.	George Ronaldson, Linwood, Paisley, Gelding, "Paddy,"		10	0	0
3.	David Annan, The Torr, Moonzie, Cupar-Fife, Mare, "Barlata,"	Medium Silver Medal,	0	10	6

SECTION 14. MARES or GELDINGS suitable for field, foaled after 1st January 1869.

1.	J. Thomson, Baillieknowe, Kelso, "Captain,"		20	0	0
2.	Captain J. G. Urquhart of Velore, Linlithgow, "William the Conqueror,"		10	0	0
3.	James Walker, Hillhead, St Andrews, "Auchinleck,"	Medium Silver Medal,	0	10	6
4.	Robert Wilson, Kingseat, Dunfermline, "Charlie,"	Minor Silver Medal,	0	6	0

SECTION 15. MARES or GELDINGS suitable for field, foaled after 1st January 1870.

1.	J. W. J. Paterson, Terrona, Langholm, Filly, "Kittiewake,"		10	0	0
2.	Colin Berwick, Stravithy Mill, St Andrews, Gelding, "Leopold,"		5	0	0
3.	Walter Bartholomew, Auchtertool Distillery, Auchtertool, Gelding, "Rufus,"	Medium Silver Medal,	0	10	6
4.	Charles Hunter, East Pilmore, Longforgan, Filly, "Atta,"	Minor Silver Medal,	0	6	0

SECTION 16. MARES or GELDINGS suitable for carriage, foaled before 1st January 1870.

1.	John Hendrie, Scotstoun House, Glasgow, Gelding, "Mounsey,"		10	0	0
2.	John Hendrie, Scotstoun House, Glasgow, Gelding, "Jock,"		5	0	0
3.	J. T. Hutchison, 28 Royal Terrace, Edinburgh, "The Shah,"	Medium Silver Medal,	0	10	6

PONIES.

SECTION 17. MARES or GELDINGS between 12 and 14 hands high.

1.	Thomas Wyse, High Street, Falkirk, "Maggie,"	Plate, value	5	0	0
2.	Patrick Panton of Edenbank, Kelso, "Tobby,"	The Silver Medal,	0	16	0
3.	Thomas Bernard, Holme House, Haddington, "Gray,"	Medium Silver Medal,	0	10	6
4.	The Duchess Dowager of Athole, Dunkeld, "Topsy,"	Minor Silver Medal,	0	6	0

SECTION 18. MARES or GELDINGS, 12 hands and under.

1.	Thomas Wyse, High Street, Falkirk, "Tommy,"	Plate, value	5	0	0
2.	Sir Wm. S. Maxwell of Keir, Bart., Dunblane, "Snowball,"	Silver Medal,	0	16	0

EXTRA HORSES.

The following were Very Highly Commended:—

Thoroughbred Stallion, "Czar"—James Houldsworth of Coltness, Wishaw,	Minor Gold Medal,	3	15	0
Highland Stallion, "Glengarry"—The Duke of Athole, K.T., Blair Castle, Blair-Athole,	Minor Gold Medal,	3	15	0
Pony Mare, "Jeanie"—James Kippen, Blairlogie, Stirling,	Minor Gold Medal,	3	15	0

The following were Highly Commended.

Thorough-bred Stallion, "Derby"—J. F. Clarke, Cowgask, Auchterarder,	The Silver Medal,	0	16	0
Highland Stallion, "Duart"—Lachlan Campbell, Baliskate, Tobermory,	The Silver Medal,	0	16	0
Half-bred Mare, "Maggie"—Robert Buist, Edinburgh,	The Silver Medal,	0	16	0

THOROUGHBRED STALLION.

James Drummond, Blacklaw, Dunfermline,	L.50	0	0
	L.438	11	6

CLASS III.—SHEEP.

CHEVIOT.

SECTION 1. TUPS above 1 Shear.

1.	James Brydon, jun., Holm of Dalquhairn, Carsphairn,		L.10	0	0
2.	Thomas Elliot, Hindhope, Jedburgh,		5	0	0
3.	James Archibald, Glengelt, Lauder,	Medium Silver Medal,	0	10	6
4.	James Brydon, Kennelhead, Moffat,	Minor Silver Medal,	0	6	0

SECTION 2. DINMONT or SHEARLING TUPS.

1.	John A. Johnstone, Archbank, Moffat,		10	0	0
2.	Thomas Elliot, Hindhope, Jedburgh,		5	0	0
3.	John A. Johnstone, Archbank, Moffat,	Medium Silver Medal,	0	10	6
4	Thomas Elliot, Hindhope, Jedburgh,	Minor Silver Medal,	0	6	0

SECTION 3. Pens of 5 EWES above 1 Shear, with Lambs.

1.	James Brydon, Kinnelhead, Moffat,		8	0	0
2.	Thomas Elliot, Hindhope, Jedburgh,		4	0	0
3.	Thomas Welsh, Ericstane, Moffat,	Medium Silver Medal,	0	10	6
4.	Sir G. Graham Montgomery, of Stanhope, Bart., M.P.,	Minor Silver Medal,	0	6	0
Lambs—1.	James Brydon, Kinnelhead, Moffat,	Silver Medal,	0	16	0
2.	Thomas Welsh, Ericstane, Moffat,	Minor Silver Medal,	0	6	0

SECTION 4. Pens of 5 SHEARLING EWES or GIMMERS.

1.	Thomas Elliot, Hindhope, Jedburgh,		8	0	0
2.	Thomas Welsh, Ericstane, Moffat,		4	0	0
3.	Thomas Elliot, Hindhope, Jedburgh,	Medium Silver Medal,	0	10	6
4.	William Moffat, Kinleith, Currie,	Minor Silver Medal,	0	6	0

BLACKFACED.

SECTION 5. TUPS above 1 Shear.

1.	John Archibald, Overshiels, Stow,		10	0	0
2.	John Archibald, Overshiels, Stow,		5	0	0
3.	James Greenshields, West Town, Lesmahagow,	Medium Silver Medal,	0	10	6
4.	David Foyer, Knowhead, Campsie,	Minor Silver Medal,	0	6	0

SECTION 6. DINMONT or SHEARLING TUPS.

1.	James Greenshields, West Town, Lesmahagow,		10	0	0
2.	John Archibald, Overshiels, Stow,		5	0	0
3.	David Foyer, Knowhead, Campsie,	Medium Silver Medal,	0	10	6
4.	John Archibald, Overshiels, Stow,	Minor Silver Medal,	0	6	0

SECTION 7. Pens of 5 EWES above 1 Shear, with Lambs.

1.	John Archibald, Overshiels, Stow,		8	0	0
2.	Donald M'Laren, Corrychrone, Callander,		4	0	0
3.	David Tweedie, Castle Crawford, Abington,	Medium Silver Medal,	0	10	6
4.	Robert Buchanan, Letter, Killearn,	Minor Silver Medal,	0	6	0
Lambs—1.	John Archibald, Overshiels, Stow,	The Silver Medal,	0	16	0
2.	Donald M'Laren, Corrychrone, Callander,	Minor Silver Medal,	0	6	0

SECTION 8. Pens of 5 SHEARLING EWES or GIMMERS.

1.	John Archibald, Overshiels, Stow,		8	0	0
2.	John Archibald, Overshiels, Stow,		4	0	0
3.	John Hamilton, Lesmahagow,	Medium Silver Medal,	0	10	6
4.	Alexander & John M'Naughton, Kerrumore, Glenlyon, Aberfeldy,	Minor Silver Medal,	0	6	0

BORDER LEICESTER.

SECTION 9. TUPS above 1 Shear.

1.	Thomas Forster, junior, Ellingham, Chathill,		10	0	0
2.	James Clark, Oldhamstocks Mains, Cockburnspath,		5	0	0
3.	Thomas Forster, junior, Ellingham, Chathill,	Medium Silver Medal,	0	10	6
4.	John Lees, Marvingston, Haddington,	Minor Silver Medal,	0	6	0
		Carry forward,	L.132	12	6

Brought forward, L.132 12 6

SECTION 10. DINMONT or SHEARLING TUPS.

1.	John Lees, Marvingston, Haddington,		10	0	0
2.	A. P. Hope, Bordlands, Noblehouse,		5	0	0
3.	James Clark, Oldhamstocks Mains, Cockburnspath,	Medium Silver Medal,	0	10	6
4.	The Marquis of Tweeddale, K.T., Yester, Haddington,	Minor Silver Medal,	0	6	0

SECTION 11. Pens of 5 EWES above 1 Shear.

1.	James Nisbet, Lambden, Greenlaw, Berwick,		8	0	0
2.	George Laing, Wark, Coldstream,		4	0	0
3.	James Fleming, Carmuirs, Falkirk,	Medium Silver Medal,	0	10	6
4.	The Duke of Buccleuch and Queensberry, K.G., Dalkeith Park, Dalkeith,	Minor Silver Medal,	0	6	0

SECTION 12. Pens of 5 SHEARLING EWES or GIMMERS.

1.	John Lees, Marvingston, Haddington,		8	0	0
2.	William Purves, Linton Burnfoot, Kelso,		4	0	0
3.	James Fleming, Carmuirs, Falkirk,	Medium Silver Medal,	0	10	6
4.	Charles Lyall, Old Montrose, Montrose,	Minor Silver Medal,	0	6	0

LONG-WOOLLED OTHER THAN LEICESTER AND BORDER LEICESTER.

SECTION 13. TUPS above 1 Shear.

1.	John Bell Irving of Whitehill, Lockerbie,		10	0	0
2.	John Wheeler & Son, Long Compton, Shipston-on-Stour,		5	0	0
3.	John Gibson, Woolmet, Dalkeith,	Medium Silver Medal,	0	10	6
4.	Thomas Wilkin, Tinwald Downs, Dumfries,	Minor Silver Medal,	0	6	0

SECTION 14. DINMONT or SHEARLING TUPS.

1	Russell Swanwick, Royal Agricultural College Farm, Cirencester,		10	0	0
2.	Thomas Wilkin, Tinwald Downs, Dumfries,		5	0	0
3.	John Bell Irving of Whitehill, Lockerbie,	Medium Silver Medal,	0	10	6
4.	Russell Swanwick, Royal Agricultural College Farm, Cirencester,	Minor Silver Medal,	0	6	0

SECTION 15. Pens of 5 EWES above 1 Shear.

1.	Thomas Wilkin, Tinwald Downs, Dumfries,		8	0	0
2.	John Bell Irving of Whitehill, Lockerbie,		4	0	0
3.	John Gibson, Woolmet, Dalkeith,	Medium Silver Medal,	0	10	6
4.	Thomas Wilkin, Tinwald Downs, Dumfries,	Minor Silver Medal,	0	6	0

SECTION 16. Pens of 5 SHEARLING EWES or GIMMERS.

1.	John Bell Irving of Whitehill, Lockerbie,		8	0	0
2.	Thomas Wilkin, Tinwald Downs, Dumfries,		4	0	0
3.	Thomas Wilkin, Tinwald Downs, Dumfries,	Medium Silver Medal,	0	10	6
4.	John Bell Irving of Whitehill, Lockerbie,	Minor Silver Medal,	0	6	0

LEICESTER.

SECTION 17. TUPS of any age.

1.	T. H. Hurchinson, Manor House, Catterick,		10	0	0
2.	T. H. Hutchinson, Manor House, Catterick,		5	0	0
3.	Eric Sutherland, Tannachie House, Fochabers,	Medium Silver Medal,	0	10	6
4.	Eric Sutherland, Tannachie House, Fochabers,	Minor Silver Medal,	0	6	0

SECTION 18. Pens of 5 EWES of any age, or GIMMERS.

1.	T. H. Hutchinson, Manor House, Catterick,		8	0	0
2.	T. H. Hutchinson, Manor House, Catterick,		4	0	0
3.	Eric Sutherland, Tannachie House, Fochabers,	Medium Silver Medal,	0	10	6
4.	Thomas Smith, Powrie, Dundee,	Minor Silver Medal,	0	6	0

SOUTHDOWN.

SECTION 19. TUPS of any age.

1	Jeremiah James Colman, Euston Lodge Farm, Norwich,		10	0	0
2.	H.R.H. The Prince of Wales. Sandringham, King's Lynn,		5	0	0
3.	Jeremiah James Colman, Euston Lodge Farm, Norwich,	Medium Silver Medal,	0	10	6
4.	H.R.H. The Prince of Wales, Sandringham, King's Lynn,	Minor Silver Medal,	0	6	0

Carry forward, L.275 17 6

Brought forward, L.275 17 6

SECTION 20. Pens of 5 EWES of any age, or GIMMERS.

			L.	s.	d.
1.	Jeremiah James Colman, Euston Lodge Farm, Norwich,		8	0	0
2.	H.R.H. The Prince of Wales, Sandringham, King's Lynn,		4	0	0

SHROPSHIRE.

SECTION 21. TUPS of any age.

			L.	s.	d.
1.	The Earl of Strathmore, Glamis Castle, Glamis,		10	0	0
2.	The Earl of Strathmore, Glamis Castle, Glamis,		5	0	0
3.	Lord Polwarth, Humbie, Upper Keith,	Medium Silver Medal,	0	10	6
4.	The Earl of Strathmore, Glamis Castle, Glamis,	Minor Silver Medal,	0	6	0

SECTION 22. Pens of 5 EWES of any age, or GIMMERS.

			L.	s.	d.
1.	The Earl of Strathmore, Glamis Castle, Glamis,		8	0	0
2.	James Walker, Hillhead, St Andrews,		4	0	0
3.	Lord Polwarth, Humbie, Upper Keith,	Medium Silver Medal,	0	10	6
4.	Lord Polwarth, Humbie, Upper Keith,	Minor Silver Medal,	0	6	0

SHORT-WOOLLED OTHER THAN SOUTHDOWN AND SHROPSHIRE.

SECTION 23. TUPS of any age.—No Award.

SECTION 24. Pens of 5 EWES of any age, or GIMMERS.—No Award.

EXTRA SECTIONS.

SECTION. 25. Pens of 5 CHEVIOT WETHERS, not above 3 Shear.

			L.	s.	d.
1.	David Welsh, Tillytogills, Fettercairn,	Minor Gold Medal,	3	15	0

SECTION 26. Pens of 5 BLACKFACED WETHERS, not above 3 Shear.

			L.	s.	d.
1.	David Welsh, Tillytogills, Fettercairn,	Minor Gold Medal,	3	15	0
2.	Thomas Roy, Tullylumb, Perth,	The Silver Medal,	0	16	0

SECTION 27. Pens of 5 HALF-BRED HOGS, not above 1 Shear.—No Entry.

SECTION 28. Pens of 5 GREYFACED HOGS, not above 1 Shear.

			L.	s.	d.
1.	Lawrence Dalgleish of Dalbeath, Brankston Grange, Culross,	Plate, value	3	0	0

EXTRA SHEEP.

The following were Commended:—

		L.	s.	d.
Five Blackfaced Wethers—The Hon. Lady Menzies, Rannoch Lodge, Pitlochrie,	Medium Silver Medal,	0	10	6
Five Shropshire Lambs belonging to James Walker, Hillhead, St Andrews,	Minor Silver Medal,	0	6	0

L.328 13 0

CLASS IV.—SWINE.

SECTION 1. BOARS, Large Breed.

			L.	s.	d.
1.	R. E. Duckering, Northorpe, Kirton Lindsey,		L.8	0	0
2.	C. R. N. Beswicke Royds, Pyke House, Littleborough,		4	0	0
3.	R. E. Duckering, Northorpe, Kirton Lindsey,	Medium Silver Medal,	0	10	6
4.	John Wheeler & Sons, Long Compton, Shipston-on-Stour,	Minor Silver Medal,	0	6	0

SECTION 2. BOARS, Small Breed.

			L.	s.	d.
1.	John Wheeler & Sons, Long Compton, Shipston-on-Stour,		8	0	0
2.	C. R. N. Beswicke Royds, Pyke House, Littleborough,		4	0	0
3.	C. R. N. Beswicke Royds, Pyke House, Littleborough,	Medium Silver Medal,	0	10	6
4.	R. E. Duckering, Northorpe, Kirton Lindsey,	Minor Silver Medal,	0	6	0

SECTION 3. SOWS, Large Breed.

			L.	s.	d.
1.	C. R. N. Beswicke Royds, Pyke House, Littleborough,		6	0	0
2.	R. E. Duckering, Northorpe, Kirton Lindsey,		3	0	0
3.	John Wheeler & Sons, Long Compton, Shipston-on-Stour,	Medium Silver Medal,	0	10	6
4.	John Moir & Son, Garthdee, Aberdeen,	Minor Silver Medal,	0	6	0

Carry forward, L.35 9 6

		Brought forward,	L.35	9	6

SECTION 4. SOWS, Small Breed.

1.	John Wheeler & Sons, Long Compton, Shipston-on-Stour,		6	0	0
2.	R. E. Duckering, Northorpe, Kirton Lindsey,		3	0	0
3.	C. R. N. Beswicke Royds, Pyke House, Littleborough,	Medium Silver Medal,	0	10	6
4.	James Alexander, Drum Mains, Kilsyth,	Minor Silver Medal,	0	6	0

SECTION 5. Pens of 3 PIGS not above 8 months old, Large Breed.

1.	R. E Duckering, Northorpe, Kirton Lindsey,		4	0	0
2.	R. E. Duckering, Northorpe, Kirton Lindsey,		2	0	0
3.	James Kay, Hill Farm, Gargunnock,	Medium Silver Medal,	0	10	6
4.	Russell Swanwick, Royal Agricultural College Farm, Cirencester,	Minor Silver Medal,	0	6	0

SECTION 6. Pens of 3 PIGS not above 8 months old, Small Breed.

1.	R. E. Duckering, Northorpe, Kirton Lindsey,		4	0	0
2.	John Wheeler & Sons, Long Compton, Shipston-on-Stour,		2	0	0
3.	George Mangles, Great Givendale, Ripon,	Medium Silver Medal,	0	10	6
4.	C. R. N. Beswicke Royds, Pyke House, Littleborough,	Minor Silver Medal,	0	6	0

EXTRA SWINE.

The following was Highly Commended.

	C. R. N. Beswicke Royds, Pyke House, Littleborough,	Silver Medal,	0	16	0
			L.59	15	0

CLASS V.—POULTRY.

SECTION 1. DORKING, Silver Grey—Cock.

1.	John Malcolm, Langton, Falkirk,	L.1	0	0
2.	James Rutherford, Nochnarie, Auchtermuchty,	0	10	0

SECTION 2. DORKING, Silver Grey—2 Hens

1.	David Amman, The Torr, Moonzie, Cupar-Fife,	1	0	0
2.	Thomas Raines, Bridge Haugh, Stirling,	0	10	0

SECTION 3. DORKING, Silver Grey—Cockerel.

1.	James Turnbull, Carnock Smithy. Larbert,	1	0	0
2.	John Fotheringham, Milnquarter, Stirling,	0	10	0

SECTION 4. DORKING, Silver Grey—2 Pullets.

1.	John Malcolm, Langton, Falkirk,	1	0	0
2.	John Curror, Comiston, Lothian Burn,	0	10	0

SECTION 5. DORKING, Coloured—Cock.

1.	Peter Symon, Errol,	1	0	0
2.	Thomas Raines, Bridge Haugh, Stirling,	0	10	0

SECTION 6. DORKING, Coloured—2 Hens.

1.	Peter Symon, Errol,	1	0	0
2.	Mrs Morrison, Coney Park Nursery, Stirling,	0	10	0

SECTION 7. DORKING, Coloured—Cockerel.

1.	Thomas Raines, Bridge Haugh, Stirling,	1	0	0
2.	Alexander Bowie, Carlogie, Carnoustie,	0	10	0

SECTION 8. DORKING, Coloured—2 Pullets.

1.	Thomas Raines, Bridge Haugh, Stirling,	1	0	0
2.	James Rutherford, Nochnarie, Auchtermuchty,	0	10	0

SECTION 9. COCHIN-CHINA—Cock.

1.	Thomas Bruce, Busby, Glasgow,	1	0	0
2.	Captain George F. Lyon, R.N., of Kirkmichael, Dumfries,	0	10	0

SECTION 10. COCHIN-CHINA—2 Hens.

1.	James Townsend Oswald of Dunnikier, Kirkcaldy,	1	0	0
2.	James Wyse, Royal Hotel, Falkirk,	0	10	0

SECTION 11. COCHIN-CHINA—Cockerel

1.	John Drinnan, Woodhall Store, Airdrie,	1	0	0
2.	James Wyse, Royal Hotel, Falkirk,	0	10	0
	Carry forward,	L.16	10	0

Brought forward,	L.16	10	0

Section 12. COCHIN-CHINA—2 Pullets.

1. James Townsend Oswald of Dunnikier, Kirkcaldy,	1	0	0
2 John Drinnan, Woodhall Store, Airdrie,	0	10	0

Section 13. BRAMAHPOOTRA—Cock.

1. Alexander Semple, East Kilbride,	1	0	0
2. William Weir, Inches, Falkirk,	0	10	0

Section 14. BRAMAHPOOTRA—2 Hens.

1. Thomas Raines, Bridge Haugh, Stirling,	1	0	0
2. David Annan, The Torr, Moonzie, Cupar-Fife,	0	10	0

Section 15. BRAMAHPOOTRA—Cockerel.

1. John Young, Hailes Cottage, Slateford,	1	0	0
2. Robert Brownlie, Townsend, Kirkcaldy,	0	10	0

Section 16. BRAMAHPOOTRA—2 Pullets.

1. John Young, Hailes Cottage, Slateford,	1	0	0
2. Robert Brownlie, Townsend, Kirkcaldy,	0	10	0

Section 17. SPANISH—Cock.

1. James Rutherford. Nochnarie, Auchtermuchty,	1	0	0
2. J. A. Dempster, 6 Albert Place, Stirling,	0	10	0

Section 18. SPANISH—2 Hens.

1. William Paterson, Brewery House, Langholm,	1	0	0
2. Edward Jardine, Stirling Station, Stirling,	0	10	0

Section 19. SPANISH—Cockerel.

1. James Norval, Alloa Park, Alloa,	1	0	0
2. John Bryce, Calderbank, Airdrie,	0	10	0

Section 20. SPANISH—2 Pullets.—No Award.

Section 21. SCOTCH GREY—Cock.

1. Charles Gray, V.S., Kirk Road, Wishaw,	1	0	0
2. Captain George F. Lyon, R.N., of Kirkmichael, Dumfries,	0	10	0

Section 22. SCOTCH GREY—2 Hens.

1. Charles Gray, V.S., Kirk Road, Wishaw,	1	0	0
2 Captain George F. Lyon, R.N., of Kirkmichael, Dumfries,	0	10	0

Section 23. SCOTCH GREY—Cockerel.

1. Charles Gray, V.S., Kirk Road, Wishaw,	1	0	0
2. Captain George F. Lyon, R.N., of Kirkmichael, Dumfries,	0	10	0

Section 24. SCOTCH GREY—2 Pullets.

1. Captain George F. Lyon, R.N., of Kirkmichael, Dumfries,	1	0	0
2. Charles Gray, V.S., Kirk Road, Wishaw,	0	10	0

Section 25. HAMBURG, Pencilled—Cock.

1. Mrs William Chalmers, Kettins, Coupar-Angus,	1	0	0
2. John Lindsay, Thornhill, Stewarton.	0	10	0

Section 26. HAMBURG, Pencilled—2 Hens.

1. James Ness, Mid Street, Pathhead, Fifeshire,	1	0	0
2. Mrs William Chalmers, Kettins, Coupar-Angus,	0	10	0

Section 27. HAMBURG, Pencilled—Cockerel.

1. George Caithness, Dundee Street, Carnoustie,	1	0	0
2. John Armstrong, Longtown, Cumberland,	0	10	0

Section 28. HAMBURG, Pencilled—2 Pullets.

1. George Caithness, Dundee Street, Carnoustie,	1	0	0
2. Alexander Bowie, Carlogie, Carnoustie,	0	10	0

Section 29. HAMBURG, spangled—Cock.

1. James Musgrave, Longtown, Cumberland,	1	0	0
2. Mrs Brown, Abercairny, Crieff,	0	10	0
Carry forward,	L.42	0	0

Brought forward, L.42 0 0

SECTION 30. HAMBURG, Spangled—2 Hens.

1	Mrs Brown, Abercairny, Crieff,	1	0	0
2.	David Draper, jun., Kerse Lane, Falkirk,	0	10	0

SECTION 31. HAMBURG, Spangled—Cockerel.

1.	Robert Bruce, Busby, Glasgow,	1	0	0
2.	Alexander Bowie, Carlogie, Carnoustie,	0	10	0

SECTION 32. HAMBURG, Spangled—2 Pullets.

1.	Robert Bruce, Busby, Glasgow,	1	0	0
2.	William Cullen, Longtown,	0	10	0

SECTION 33. POLISH—Cock.

1.	John Stevenson, Chapel Hall, Airdrie,	1	0	0

SECTION 34. POLISH—2 Hens.

1.	David Draper, jun., Kerse Lane, Falkirk,	1	0	0

SECTION 35. POLISH—Cockerel.

1.	Alexander Bowie, Carlogie, Carnoustie,	1	0	0
2.	J. A. Dempster, 6 Albert Place, Stirling,	0	10	0

SECTION 36. POLISH—2 Pullets.

1.	J A. Dempster, 6 Albert Place, Stirling,	1	0	0
2.	Alexander Bowie, Carlogie, Carnoustie,	0	10	0

SECTION 37. GAME, Black or Brown Reds—Cock.

1.	William Webster, Denburn House, Kirkcaldy,	1	0	0
2	R. Stewart, Blair-Adam,	0	10	0

SECTION 38 GAME, Black or Brown Reds—1 Hen.

1.	David Harley, Rosebank, Bonnington Road, Edinburgh,	1	0	0
2.	T. W. Mitchell, 44 North Methven Street, Perth,	0	10	0

SECTION 39. GAME, Black or Brown Reds—Cockerel.

1.	T. W. Mitchell, 44 North Methven Street, Perth,	1	0	0
2.	R. Stewart, Blair-Adam,	0	10	0

SECTION 40. GAME, Black or Brown Reds—1 Pullet.

1.	David Harley, Rosebank, Bonnington Road, Edinburgh,	1	0	0
2.	R. Stewart, Blair-Adam,	0	10	0

SECTION 41. GAME, Duckwings—Cock.

1.	T. W. Mitchell, 44 North Methven Street, Perth,	1	0	0
2.	David Harley, Rosebank, Bonnington Road, Edinburgh,	0	10	0

SECTION 42. GAME, Duckwings—1 Hen.

1.	David Harley, Rosebank, Bonnington Road, Edinburgh,	1	0	0
2.	James Hall, Leslie,	0	10	0

SECTION 43. GAME, Duckwings—Cockerel.

1.	R. Stewart, Blair-Adam,	1	0	0
2.	R. Stewart, Blair-Adam,	0	10	0

SECTION 44. GAME, Duckwings—1 Pullet.

1.	David Harley, Rosebank, Bonnington Road, Edinburgh,	1	0	0
2.	R. Stewart, Blair-Adam,	0	10	0

SECTION 45. BANTAMS, Game—Cock.

1.	James Denholm, Carberry, Hillhead, Musselburgh,	1	0	0
2.	Mrs Robert Frew, Sinclairtown, Kirkcaldy,	0	10	0

SECTION 46. BANTAMS, Game—1 Hen.

1.	Sir George Macpherson Grant of Ballindalloch, Bart., Ballindalloch,	1	0	0
2.	Robert Brownlie, Townsend, Kirkcaldy,	0	10	0

SECTION 47. BANTAMS, Game—Cockerel.

1.	Mrs Alexander Frew, sen., Sinclairtown, Kirkcaldy,	1	0	0
2.	George K. Scobie, Beveridgewell, Dunfermline,	0	10	0

Carry forward, L.68 0 0

Brought forward, L.68 0 0

SECTION 48. BANTAMS, Game—1 Pullet.

1. George K. Scobie, Beveridgewell, Dunfermline,	1	0	0
2. Alexander Frew, Sinclairtown, Kirkcaldy,	0	10	0

SECTION 49. BANTAMS, Sebright—Cock.

1. James Rutherford, Nochnarie, Auchtermuchty,	1	0	0
2. Miss Bessie Parker Frew, Sinclairtown, Kirkcaldy,	0	10	0

SECTION 50. BANTAMS, Sebright—2 Hens.

1 J. A Dempster, 6 Albert Place, Stirling,	1	0	0
2 Miss Rachel Clark Frew, Sinclairtown, Kirkcaldy,	0	10	0

SECTION 51. BANTAMS, Sebright—Cockerel.

1. Miss Jane Millar Frew, Sinclairtown, Kirkcaldy,	1	0	0
2. James Rutherford, Nochnarie, Auchtermuchty,	0	10	0

SECTION 52. BANTAMS, Sebright—2 Pullets.

1. Alexander Frew, Townend North, Kilmarnock,	1	0	0

SECTION 53. BANTAMS, any other variety—Cock.

1. James Rutherford, Nochnarie, Auchtermuchty,	1	0	0
2. Miss Bessie Parker Frew, Sinclairtown, Kirkcaldy,	0	10	0

SECTION 54. BANTAMS. any other variety—2 Hens.

1. Miss Bessie Parker Frew, Sinclairtown, Kirkcaldy,	1	0	0
2 Miss Rachel Clark Frew, Sinclairtown, Kirkcaldy,	0	10	0

SECTION 55. BANTAMS, any other variety—Cockerel.

1. Mrs Robert Frew, Sinclairtown, Kirkcaldy,	1	0	0

SECTION 56. BANTAMS, any other variety—2 Pullets,

1. Robert Frew, Sinclairtown, Kirkcaldy,	1	0	0

SECTION 57. POULTRY, any other Pure Breed—Cock.

1. Richard Little, Dickstree, Longtown,	1	0	0

SECTION 58. POULTRY, any other Pure Breed—2 Hens.

1. Captain G. F. Lyon, R.N., of Kirkmichael, Dumfries,	1	0	0

SECTION 59. POULTRY, any other Pure Breed—Cockerel.

1. Miss Rachel Clark Frew, Sinclairtown, Kirkcaldy,	1	0	0
2. James Rutherford, Nochnarie, Auchtermuchty,	0	10	0

SECTION 60. POULTRY, any other Pure Breed—2 Pullets.

1. Alexander Frew, Sinclairtown, Kirkcaldy,	1	0	0
2. James Rutherford, Nochnarie, Auchtermuchty,	0	10	0

SECTION 61. DUCKS—White Aylesbury—Drake.

1. Alexander Bowie, Carlogie, Carnoustie,	1	0	0
2. Captain G. F. Lyon, R.N., of Kirkmichael, Dumfries,	0	10	0

SECTION 62. DUCKS—White Aylesbury—2 Ducks.

1. Alexander Bowie, Carlogie, Carnoustie,	1	0	0
2. William Pattie, Castleyards, Dumfries,	0	10	0

SECTION 63. DUCKS—White Aylesbury—Drake (Young).

1. William Weir, Inches Farm, Falkirk,	1	0	0
2. William Pattie, Castleyards, Dumfries,	0	10	0

SECTION 64. DUCKS—White Aylesbury—2 Ducklings.

1. William Weir, Inches Farm, Falkirk,	1	0	0
2. Gilbert Amos, Market Place, Melrose,	0	10	0

SECTION 65. DUCKS—Rouen—Drake.

1. David Hardie, Priesthaugh, Hawick,	1	0	0
2. Captain Maitland Dougall, R.N., of Scotscraig, Tayport,	0	10	0

SECTION 66. DUCKS—Rouen—2 Ducks.

1. Captain Maitland Dougall, R.N., of Scotscraig, Tayport,	1	0	0
2. David Hardie, Priesthaugh, Hawick,	0	10	0

Carry forward, L.94 0 0

Brought forward,	L.94	0	0

SECTION 67. DUCKS—Rouen—Drake (Young).

1. Captain G. F. Lyon, R.N., of Kirkmichael, Dumfries,	1	0	0
2. Captain Maitland Dougall, R.N., of Scotscraig, Tayport,	0	10	0

SECTION 68. DUCKS—Rouen—2 Ducklings.

1. Captain Maitland Dougall, R.N., of Scotscraig, Tayport,	1	0	0
2. Captain G. F. Lyon, R.N., of Kirkmichael, Dumfries,	0	10	0

SECTION 69. DUCKS—Any other Pure Breed—Drake.

1. Miss Norton, Rannoch Lodge, Pitlochrie,	1	0	0

SECTION 70. DUCKS—Any other Pure Breed—2 Ducks.—No Entry.

SECTION 71. DUCKS—Any other Pure Breed—Drake (Young).—No Entry.

SECTION 72. DUCKS—Any other Pure Breed—2 Ducklings.—No Entry.

SECTION 73. TURKEYS—Black Norfolk—Cock.

1. Captain Maitland Dougall, R.N., of Scotscraig, Tayport,	1	0	0
2. William Weir, Inches, Falkirk,	0	10	0

SECTION 74. TURKEYS—Black Norfolk—2 Hens.

1. Captain Maitland Dougall, R.N., of Scotscraig, Tayport,	1	0	0

SECTION 75. TURKEYS—Black Norfolk—Cock (Poult).—No Entry.

SECTION 76. TURKEYS—Black Norfolk—2 Hens (Poults).—No Entry.

SECTION 77. TURKEYS—Any other Breed—Cock.

1. Miss Norton, Rannoch Lodge, Pitlochrie,	1	0	0
2. David Hardie, Priesthaugh, Hawick,	0	10	0

SECTION 78. TURKEYS—Any other Breed—2 Hens.

1. David Hardie, Priesthaugh, Hawick,	1	0	0
2. Miss Norton, Rannoch Lodge, Pitlochrie,	0	10	0

SECTION 79. TURKEYS—Any other Breed—Cock (Poult).

1. Lady Gladstone of Fasque, Laurencekirk,	1	0	0

SECTION 80. TURKEYS—Any other Breed—2 Hens (Poults).

1. Lady Gladstone of Fasque, Laurencekirk,	1	0	0

SECTION 81. GEESE—Grey Toulouse—Gander.

1. David Hardie, Priesthaugh, Hawick,	1	0	0

SECTION 82. GEESE—Grey Toulouse—2 Geese.

1. David Hardie, Priesthaugh, Hawick,	1	0	0

SECTION 83. GEESE—Grey Toulouse—Gander (Young).

1. David Hardie, Priesthaugh, Hawick,	1	0	0

SECTION 84. GEESE—Grey Toulouse—2 Goslings.—No Entry.

SECTION 85. GEESE—Embden—Gander.—No Entry.

SECTION 86. GEESE—Embden—2 Geese.—No Entry.

SECTION 87. GEESE—Embden—Gander (Young).—No Entry.

SECTION 88. GEESE—Embden—2 Goslings.—No Entry.

SECTION 89. GEESE—Any other Pure Breed—Gander.

1. Captain C. F. Lyon, R.N., of Kirkmichael, Dumfries,	1	0	0

SECTION 90. GEESE—Any other Pure Breed—2 Geese.—No Entry.

SECTION 91. GEESE—Any other Pure Breed—Gander (Young).—No Entry.

SECTION 92. GEESE—Any other Pure Breed—2 Goslings.—No Entry.

	L.109	10	0

CLASS VI.—IMPLEMENTS.

Silver Medals were awarded to the following:—

1. J. & F. Howard, Britannia Iron Works, Bedford, for Collection.
2. W. N. Nicholson & Son, Trent Iron Works, Newark-on-Trent, for Collection.
3. Samuelson & Co., Britannia Works, Banbury, for Collection.
4. John Unite, 291 Edgeware Road, London, for Square Tent; Alpine Tent; and Collection.
5. Walter A. Wood, 77 Upper Thames Street, London, for Reaping Machines.
6. Gibson & Tait, Bainfield Iron and Wire Works, West Fountain Bridge, Edinburgh, for Collection.
7. Harrison, M'Gregor, & Co., Albion Foundry, Leigh, Manchester, for 3 Two-horse Mowing Machines; and 3 Two-horse Combined Machines.
8. James Howorth, Victoria Works, Farnworth, Bolton, for Collection.
9. Thomas Hunter, Implement Works, Maybole, for 2 Patent Turnip Thinners.
10 Alexander Jack & Sons, Maybole, for Patent Double Ridging or Drill Plough, invented by P. Wilson, Noblehall, Peebles; and Collection.
11. Lindsay & Anderson, Lilliehill Fireclay Works, Dunfermline, for Collection.
12. G. W. Murray & Co., Banff Foundry, Banff, for Collection.
13. T. Pirie & Co., Kinmundy, Longside, Aberdeenshire, for Collection.
14. European Sewing Machine Company, 128 Portland Street, Manchester, per Redpath & Co., Roxburgh Street, Kelso, for Collection.
15. Ben. Reid & Co., Agricultural Implement Makers, Aberdeen, for Collection.
16. George Sellar & Son, Huntly, for Collection.
17. Thomas Sherriff & Co., Westbarns, Dunbar, for Two-row Turnip and Mangold Sowing Machine; and Collection.
18. Robey & Co. (Limited), Perseverance Iron Works, Lincoln, for Patent Iron-Framed Thrashing and Finishing Machine.
19. Wilson, M'Lay, & Co., 87 St Vincent Street, Glasgow, for 2 Rock-Boring Machines, made by Craven Brothers.
20. Wilson, M'Lay, & Co., 87 St Vincent Street, Glasgow, for Air Compresser, made by Craven Brothers.

20 Silver Medals, L.16.

Medium Silver Medals were awarded to the following:—

1. A. Jenkinson, 10 Princes Street, Edinburgh, for Collection.
2. William Lincolne, 77 John Street, Glasgow, and 32 Ludgate Hill, London, for Collection.
3. MacNie & Baird, Barnsdale Machine Works, Stirling, for Four Patent Hand Punching Bears; Small Hand Punch; and Rail Puncher; all invented by Robert Baird.
4. Mrs Paterson, 38 Union Street, Dundee, for Collection.
5. Thomas & Taylor, Salford, Manchester, and Stockport, for Washing Machines.
6. Thornton, Currie, & Co., 78 Princes Street, Edinburgh, for Collection.
7. Richard Bickerton & Sons, Old Tweed Implement Works, Berwick-on-Tweed, for Patent Self-Delivery Reaper, "Excelsior Excelled;" and Patent Reaper, "Little Wonder."
8. Kemp, Murray, & Nicholson, Stirling, for Collection.
9. Kimbal & Morton, 114 Argyle Street, Glasgow, for Overhead Sack Sewing Machine.
10. Lillie & Elder, Tweedmouth, Berwick-on-Tweed, for Four Patent Imperial Reapers and Mowers; Patent Imperial Reaper and Mower; Buck-eye Reaper and Mower; and Two Berwick Eclipse Mowers and Reapers.
11. Picksley, Sims, & Co. (Limited), Bedford Foundry, Leigh, Lancashire, for Patent Heavy Combined Mowers and Reapers; Patent Light Combined Mowers and Reapers; and Collection.
12. Richmond & Chandler, Salford, Manchester, for Chaff Cutters.
13. George Thomson, Coachbuilder, Stirling, for Sanitary Ambulance Omnibus, with sliding Bed for Patient, and seats for attendants; and Collection.
14. George Anderson, Westwood, Stirling, for Collection.
15. William Bain & Co., Lochrin Iron Works, Edinburgh, for Collection.
16. W. S. Boulton & Co., Rose Lane Iron Works, Norwich, for Collection.
17. Brigham & Co., Tweed Implement Works, Berwick-on-Tweed, for Patent Drill Roller.
18. John Doe, Errol. for Horse Rake, M.B., made by Ransome, Sims, & Head.
19. John Gregory, Westoe, South Shields, for Single-Horse Reaping Machine.
20. David Hally, Ruthvenside, Auchterarder, for Two-Horse Swing Plough.
21. Haughton & Thompson, Carlisle, for Patent Self-Acting Horse Hay Rake.
22. William H. Kirkwood, Lothian Bridge, Dalkeith, for Norwegian Harrow.
23. G. & W. Porteous, Flora Bank, Haddington, for Combined Reaping and Mowing Machine.
24. Edwin Sherwood, Kirkbridge, Bedale, for Two-Horse Reaper; and One-Horse Reaper.
25. Stuart & Co., 8 Thomas Street, Edinburgh, for Collection.
26. John Fowler & Co., India Buildings, Edinburgh, and Leeds, for Six-Horse Power Traction Engine.
27. Henry R. Marsden, Leeds, for Stone Breaker.

27 Medium Silver Medals, L.14, 3s. 6d.

Minor Silver Medals were awarded to the following:—

1. Robert Adams, 4 Rutland Place, Edinburgh, for Collection.
2. Thomas Bradford & Co., Cathedral Steps, Manchester, and 63 Fleet Street, London, for Collection.
3. Dobbie & Forbes, 92 Mitchell Street, Glasgow, and Larbert, for Portable Boilers.
4. W. & H. M. Goulding (Limited), Dublin and Cork, for Produce Grown with Goulding's Manure.
5. Graham & Morton, King Street, Stirling, for Collection.
6. William Hawley (of Minton, Hollins, & Co., Tile Manufacturers), 27 Frederick Street, Edinburgh, for Collection.
7. John Hislop, Goatfield Coachworks, Haddington, and 13 Antigua Street, Edinburgh, for Ashford Car, with Springs attached to Shafts to carry off Horse motion.
8. Virtue & Ferguson, 14 Murray Place, Stirling, for Collection.
9. Butters Brothers, 26 Renfield Street, Glasgow, for Patent Triple-Action Steam Pump, with Vertical Boiler, made by Wilson.
10. Marquis Brothers, Bon-Accord Works, Glasgow, for Twelve-inch Direct Acting Centrifugal Pumping Engine; and Portable Centrifugal Pumping Engine.
11. James Dickson & Sons, 32 Hanover Street, Edinburgh, for Collection.
12. R. T. Mackintosh, 12 Melbourne Place, Edinburgh, for Collection.

12 Minor Silver Medals, L.3, 12s.

Awards at Trial of Reapers held at King's Park Farm, on the 12th of September 1873—

J. & F. Howard, Bedford, for European Reaper, .	Medium Gold Medal,	L.6	2	0
J. & F. Howard, Bedford, for International Reaper, .	Medium Gold Medal	6	2	0
Samuelson & Co., Banbury, for Royal Reaper, .	. Minor Gold Medal,	3	15	0
W. A. Wood, London, for Combined Reaper and Mower,	. Minor Gold Medal,	3	15	0
W. A. Wood, London, for Champion Reaper, . . .	Silver Medal,	0	16	0
J. Bisset, & Sons, Blairgowrie, for Self-Delivering Reaper, .	Silver Medal,	0	16	0
Jas. D. Allan & Sons, Culthill, Dunkeld, for Self-Delivery Reaper,	Medium Silver Medal,	0	10	6

Award at Trial of Potato Diggers, held at Broomridge, on the 15th October 1873—

Corbett & Peel, Perseverance Iron Works, Shrewsbury,	Medium Gold Medal,	6	2	0
		L.27	18	6

ABSTRACT OF PREMIUMS.

Cattle, ...			L.805 8 0
Horses, ...			438 11 6
Sheep, ...			328 13 0
Swine, ...			59 15 0
Poultry, ...			109 10 0
Implements—			
20 Silver Medals, ...		L.16 0 0	
27 Medium Silver Medals, . . .		14 3 6	
12 Minor Silver Medals, . . .		3 12 0	
Reapers and Potato Diggers.			
3 Medium Gold Medal, .	L.18 6 0		
2 Minor Gold Medals, .	7 10 0		
2 Silver Medals, . .	1 12 0		
1 Medium Silver Medal, .	0 10 6		
			61 14 0
			L.1803 11 6

LIST OF JUDGES.

Shorthorn.—Joseph Culshaw, Towneley Park, Burnley; H. Chandos Pole Gell, Hopton Hall, Wirksworth; James Whyte, Little Clinterty, Blackburn, Aberdeen. *Attending Members*—Alex. Smollett of Bonhill; John Macfarlan, Faslane.

Polled Angus.—John Collie, Elgin; Thomas Ferguson, Kinnochtry, Coupar Angus; George Philip, Boynds, Keith Hall, Inverurie. *Attending Members*—Alex. Buchanan, Garscadden Mains; J. B. Hamilton of Leny.

Galloway.—John Graham of Shaw, Lockerbie; James Grierson, Kirkland, Haugh of Urr, Dalbeatie; Allan C. Pagan, Innergeldie, Comrie, Crieff. *Attending Members*—H. D. Erskine of Cardross; Peter Dewar, King's Park.

Ayrshire.—Robert Guthrie, Crossburn, Troon; Robert M'Kean, Lumloch, Bishopbriggs; John Waugh, St John's Kirk, Biggar. *Attending Members*—H. R. B. Peile, Catter House; Andrew Dewar, Arnprior.

Highland.—James Jardine, Killunan, Fintry, Stirling; Alexander Macdonald, Balranald, Lochmaddy; John M'Lauchlan, Frenich, Foss, Pitlochrie. *Attending Members*—Lord Balfour of Burleigh; James Macnab, Loaning Bank.

Fat Cattle and Extra Sections of Sheep.—John Bell, 172 Argyle Street, Glasgow; James Wilson, 146 George Street, Edinburgh; Alexander Young, Keir Mains, Dunblane. *Attending Members*—John Campbell of Inverardoch; John Dewar, Doune Castle Farm.

Draught Stallions and Colts.—Robert Wilson, Durn, Perth; Robert Murdoch, Hallside, Cambuslang; James Coubrough, Blairtummoch, Lennoxtown. *Attending Members*—Sir A. C. R. Gibson Maitland, Bart., M.P.; Andrew Mitchell, Alloa.

Draught Mares and Fillies.—John Young, Fulwood, Paisley; William Park, Dalmuir, Duntocher; William Lang, Lochmill, Milton of Campsie. *Attending Members*—Sir William Bruce of Stenhouse, Bart.; William Brock, Barns of Clyde.

Hunters, Roadsters, and Ponies.—William Ford, Hardengreen, Dalkeith; Andrew Gillon of Wallhouse, Bathgate; George Stodart, 80 West Nile Street, Glasgow. *Attending Members*—William Forbes of Callendar; William Allan, Park.

Cheviot.—John Jardine, Arkleton, Langholm; Robert Paterson of Birthwood, Biggar; John Robson, Byrness, Otterburn. *Attending Members*—James R. Gibson Maitland, yr. of Clifton Hall; J. T. Scott Paterson, Plean.

Blackfaced.—James Craig of Craigdarroch, New Cumnock; Robert Elliot, Laighwood, Dunkeld; Donald M'Intyre, Tigh-na-blair, Comrie, Crief. *Attending Members*—R. P. Newton of Castlandhill; Peter Curror, Coxithill.

Border Leicester.—John Dickinson, Bemersyde Cottage, St Boswell's; Adam Smith, Stevenson Mains, Haddington; John Usher, Stodrig, Kelso. *Attending Members*—W. A. Maclachlan of Auchentroig; Ralph Stark, Camelon.

Leicester and other Long-Woolled.—Joseph Bell, Scalehill, Penrith; George H. Sanday, Holme Pierrepont, Nottingham; James Topham, The Hemploe, Welford, Rugby. *Attending Members*—John M. Martin, Auchinfroe; Alex. Mitchell, Alloa.

Southdown, Shropshire, and other Short-Woolled.—William Borthwick, Monkwray, Whitehaven; R. H. Masfen, Pendeford, Wolverhampton; James Skirving, Luffness Mains, Drem. *Attending Members*—Robert Moubray, Cambus; John S. Jack, Carrat.

Swine.—T. D. Findlay, Easterhill, Glasgow; James Graham, Parcelstown, Longtown; George Harvey, Whittingham Mains, Prestonkirk. *Attending Members*—Alex. Macnab of Techmuiry; David Foyer, Knowehead.

Poultry—*Sections* 1 *to* 39 *inclusive.*—Richard Teebay, Fulwood, Preston; James Wilson, Wester Cowden, Dalkeith. *Attending Members*—Thomas Turnbull, Stirling; H. F. Campbell of Bolquhan. *Section* 40 *to end.*—John Gibson, Woolmet, Dalkeith; Patrick Small Keir of Kindrogan, Pitlochrie. *Attending Members*—Sir Henry Seton Steuart, Bart.; Thomas Muir.

Implements.—James W. Hunter of Thurston, Chairman of the Society's Machinery Committee; David Stevenson, C.E., Edinburgh, Consulting Engineer to the Society; James D. Park, Practical Engineer to the Society; Professor Wilson, Edinburgh; John Gibson, Woolmet, Dalkeith; Thomas Mylne, Niddrie Mains, Liberton; John Munro, Fairington, Kelso; P. B. Swinton, Holyn Bank, Gifford; T. R. B. Leslie Melville Cartwright, Melville House, Ladybank; Sir Alex. C. R. Gibson Maitland of Clifton Hall, Bart., Convener of Local Committee; The Earl of Dunmore; H. D. Erskine of Cardross, Stirling; R. P. Newton of Castlandhill, Polmont Bank, Falkirk; Baillie Anderson, Stirling; Archibald Campbell, Dunmore, Stirling; David Ballingall, Blairdrummond, Stirling; Robert Paterson, Cardross, Stirling.

III.—DISTRICT COMPETITIONS.

CATTLE.

NAME OF DIST.	PREMIUM AWARDED TO	FOR			AMOUNT.
Stewartry	Maxwell Clark of Little Culmain	Galloway Bull, Class II.*			L.3 0 0
of Kirk-	John Thomson, Blaiket	do.	do.		2 0 0
cudbright	James Cunningham, Tarbreoch	do.	do.	Minor Sil. Medal	0 6 0
	James Cunningham, Tarbreoch	Galloway Heifer			3 0 0
	James Cunningham, Tarbreoch	do.			2 0 0
	W. & J. Shennan, Balig	do.		Minor Sil. Medal	0 6 0
				Carry forward	L.10 12 0

* Two-year old Bulls.

NAME OF DIST.	PREMIUM AWARDED TO	FOR			AMOUNT.		
				Brought forward .	L.10	12	0
Nithsdale	Duke of Buccleuch and Queensberry, K.G.	Ayrshire Bull . .		Silver Medal	0	16	0
	James Smith, Glenmanna	do.	Class I.†	. . . .	2	0	0*
	James Moffat, Gateside	do.	do.	. . . .	1	10	0*
	Abram Kerr, Castlehill	do.	Class II.	. . . .	3	0	0
	James Moffat, Gateside	do.	do .	. . . .	2	0	0
	James Moffat, Gateside	do.	do.	Minor Sil. Medal	0	6	0
	Thomas Kerr, Whitehill	Ayrshire Heifer	.	. . . .	3	0	0
	George Corson, Marr *	do.	. .	. . . .	2	0	0
	George Corson, Marr	do.	. .	Minor Sil. Medal	0	6	0
Island of Skye	John Macleod, Monkstadt	Highland Heifer	.	. . . .	3	0	0
	John Macleod, Monkstadt	do.	. .	. . . .	2	0	0
	John Macleod, Monkaladt	do.	. .	Minor Sil. Medal	0	6	0
Lorn and Nether Lorn	N. M. Macdonald of Dunach	Highland Bull . .		Silver Medal	0	16	0
	James M'Kechnie, Glenmore	Highland Bull,	Class I.	. . . .	4	0	0
	John M'Diarmid, Reray	do.	do. .	. . . .	3	0	0
	Donald M'Callum, Balligowan	do.	do.	Minor Sil. Medal	0	6	0
	James M'Kechnie, Glenmore	do.	Class II.	. . . .	3	0	0
	James M'Kechnie, Glenmore	do.	do.	. . . .	2	0	0
	John M'Diarmid, Reray	do.	do.	Minor Sil. Medal	0	6	0
	James M'Kechnie, Glenmore	Highland Heifer	.	. . . .	3	0	0
	Duncan M'Lachlan, Duaig	do.	. .	. . . .	2	0	0
	N. M. Macdonald of Dunach	do	. .	Minor Sil. Medal	0	6	0
Argyll	Alexander Holme, Ballimore	Ayrshire Bull,	Class I.	. . . .	2	0	0*
	Alexander M'Farlane, Cambaan	do.	do.	. . . .	1	10	0*
	Alexander Holme, Ballimore	do.	Class II.	. . . .	3	0	0
	D. & R. Davie, Dunadd	do.	do.	. . . .	2	0	0
	D. & R. Davie, Dunadd	do.	do.	Minor Sil. Medal	0	6	0
	James Holm, Castleton	Ayrshire Heifer	.	. . . .	3	0	0
	F. C. T. Gascoigne, Craignish Castle	do.	. .	. . . .	2	0	0
	Dugald M'Callum, Carmacery	do.	. .	Minor Sil. Medal	0	6	0
Vale of Alford	James Reid, Greystone	Shorthorn Bull,	Class I.	. . . .	4	0	0
	William Ironside, Tonley	do.	do.	. . . .	3	0	0
	William Benton, Harthill	do.	do.	Minor Sil. Medal	0	6	0
	William Mitchell, Auchnagathle	Shorthorn Bull,	Class II.	. . . .	3	0	0
	G. Wilken, Waterside of Forbes	do.	do.	. . . .	2	0	0
	G. Wilson, Whiteside	do.	do.	Minor Sil. Medal	0	6	0
	William M'Combie, M.P., Tillyfour	Polled Heifer .	.	. . . .	3	0	0
	H. D. Adamson, Balquharn	do.	. .	. . . .	2	0	0
	H. D Adamson, Balquharn	do.	. .	Minor Sil. Medal	0	6	0
Inveraray	John M'Arthur of Barbreck	Highland Bull . .		Silver Medal	0	16	0
	Duncan M'Arthur, Achadunan	do.	Class I.	. . . .	4	0	0
	Charles Turner, Maam	do.	do.	. . . .	3	0	0
	Duncan T. Campbell, Achalian	do.	do.	Minor Sil. Medal	0	6	0
	Duncan M'Arthur, Achadunan	do.	Class II.	. . . .	1	10	0*
	Robert Blair, Tombreck	do.	do.	. . . .	1	0	0*
	Duncan M'Arthur, Achadunan	Highland Heifer	.	. . . .	3	0	0
	John M'Arthur, Barbreck	do.	. .	. . . .	2	0	0
	John M'Arthur, Barbreck	do.	. .	Minor Sil. Medal	0	6	0
Spey, Avon, and Fuldochside	John Fleming, Marionburgh	Shorthorn Bull . .		Silver Medal	0	16	0
	Alexander Gilbert, Knockhurn	do.	Class I.	. . . .	2	0	0*
	J. & G. Grant, Glenfarclas	do.	do.	. . . .	1	10	0*
	William Birnie, Belnagarrow	do.	Class II.	. . . .	3	0	0
	William Birnie, Belnagarrow	do.	do.	. . . .	2	0	0
	James Fraser, Mains of Kirdels	do.	do.	Minor Sil. Medal	0	6	0
	W. M. Skinner, Drumin	Polled Heifer .	.	. . . .	3	0	0
	William Robertson, Burnside	do.	. .	. . . .	2	0	0
	W. M. Skinner, Drumin	do.	. .	Minor Sil. Medal	0	6	0
				Carry forward .	L.112	6	0

* Half Premiums awarded, the number of Lots being under four.

† Aged Bulls.

NAME OF DIST.	PREMIUM AWARDED TO	FOR		AMOUNT.		
		Brought forward		L.112	6	0
Islay, Jura, and Colonsay	Hugh Stevenson, Laggan	Ayrshire Bull, Class I.	Minor Sil. Medal	0	6	0
	John Johnston, Tallant	do. Class II.	Minor Sil. Medal	0	6	0
	D. Simpson, Coull	Ayrshire Heifer	Minor Sil. Medal	0	6	0
Deeside	Francis Farquharson of Finzean	Shorthorn Bull	Silver Medal	0	16	0
	Mrs Leighton, Bowbutts	do. Class I.	Minor Sil. Medal	0	6	0
	D. Nicol, Upper Anguston	do. Class II	Minor Sil. Medal	0	6	0
	John Smith, Campfield	Polled Heifer	Minor Sil. Medal	0	6	0
Renfrew	Thomas Clark, Drumlie	Ayrshire Bull, Class I.	Minor Sil. Medal	0	6	0
	Mrs Douglas, Green	do. Class II.	Minor Sil. Medal	0	6	0
	Mrs Douglas, Green	Ayrshire Heifer	Minor Sil. Medal	0	6	0
Elgin	George Brown, Westertown	Polled Bull, Class I.	Minor Sil. Medal	0	6	0
	Alexander Paterson, Mulben	do. Class II.	Minor Sil. Medal	0	6	0
	George Brown, Westertown	Polled Heifer	Minor Sil. Medal	0	6	0

HORSES FOR AGRICULTURAL PURPOSES.

NAME OF DIST.	PREMIUM AWARDED TO	FOR		AMOUNT.		
Buchan	Peter M'Robie, Sunnyside	Stallion		25	0	0
Kinross	James Garven, Monk Castle	Stallion		25	0	0
Selkirk & Galashiels	James Gourlay, West Farm	Stallion		25	0	0
Caithness	George Gray, Easterton	Stallion		25	0	0
Inverness	Charles M'Kessack, Culblair	Brood Mare		4	0	0
	James Lawrence, Mills of Forres	do.		3	0	0
	Alexander Winton, Viewhill	do.	Minor Sil. Medal	0	6	0
Haddington	Adam Smith, Stevenson Mains	Brood Mare		4	0	0
	Adam Smith, Stevenson Mains	do.		3	0	0
	Adam Smith, Stevenson Mains	do.	Minor Sil. Medal	0	6	0
Black Isle	James B. Mitchell, Drynie	Brood Mare		4	0	0
	Jonathan Middleton, Davidston	do.		3	0	0
	Jonathan Middleton, Davidston	do.	Minor Sil. Medal	0	6	0
Ayr	James Kerr, Lochend	Two-year old Colt		3	0	0
	John Cowan, Bridge of Aird	do.		2	0	0
	James Brown, Ardneil	do.	Minor Sil. Medal	0	6	0
	J. N. Fleming of Knockdon	One-year old Colt		2	0	0
	J. M. Martin, Auchinfroe	do.		1	0	0
	James Miller, Burnbank	do.	Minor Sil. Medal	0	6	0
	David Hunter, Guiltreehill	Two-year old Filly		3	0	0
	William Caldwell, Boydston	do.		2	0	0
	J. N. Fleming of Knockdon	do.	Minor Sil. Medal	0	6	0
	J. N. Fleming of Knockdon	One-year old Filly		2	0	0
	Robert Hutchison, Criacksland	do.		1	0	0
	William Caldwell, Boydston	do.	Minor Sil. Medal	0	6	0

SHEEP.

NAME OF DIST.	PREMIUM AWARDED TO	FOR		AMOUNT.		
Athole and Weem	Duke of Athole, K.T.	Blackfaced Tup	Silver Medal	0	16	0
	Duchess Dowager of Athole	Blackfaced Shearling Tup		3	0	0
	David Guild, Monzie	do.		1	0	0
	Duchess Dowager of Athole	do.	Minor Sil. Medal	0	6	0
Eskdale and Liddesdale	Robert Turnbull, Falnash	Cheviot Tup	Silver Medal	0	16	0
	J. L. Howatson, Becks	do.		3	0	0
	Thomas C. Borthwick, Hopsrigg	do.		1	0	0
	William Little, Burnfoot	do.	Minor Sil. Medal	0	6	0
		Carry forward		L.266	0	0

NAME OF DIST.	PREMIUM AWARDED TO	FOR	AMOUNT.		
		Brought forward	L 266	0	0
Eskdale and Liddesdale.	J. J. M. Borthwick, Georgefield	Cheviot Shearling Tup	3	0	0
	Thomas C. Borthwick, Hopsrigg	do.	1	0	0
	James Jardine of Larriston	do. Minor Sil. Medal	0	6	0
	J. J. M. Borthwick, Georgefield	Cheviot Ewes	3	0	0
	Robert Turnbull, Falnach	do.	1	0	0
	Thomas C. Borthwick, Hopsrigg	do. Minor Sil. Medal	0	6	0
	Thomas C. Borthwick, Hopsrigg	Cheviot Gimmers	3	0	0
	James Paterson, Terrona	do.	1	0	0
	Thomas C. Borthwick, Hopsrigg	do. Minor Sil. Medal	0	6	0
Cowal	Thomas Lochead, Gartonansaig	Cheviot Tup	3	0	0
	John Mercer, Arnnadam	do.	1	0	0
	Thomas Lochead, Gartonansaig	do. Minor Sil. Medal	0	6	0
	Thomas Lochead, Gartonansaig	Cheviot Shearling Tup	3	0	0
	John Turner, Stronchallen	do.	1	0	0
	John Turner, Stronchallen	do. Minor Sil. Medal	0	6	0
	Thomas Lockhart, Gartonansaig	Cheviot Ewes	3	0	0
	James Turnbull, Dallilongart	do.	1	0	0
	Daniel Mercer, Achamore	do. Minor Sil. Medal	0	6	0
	Thomas Lochead, Gartonansaig	Cheviot Gimmers	3	0	0
	James Turnbull, Dallilongart	do.	1	0	0
	W. R. Davison, Coylett	do. Minor Sil. Medal	0	6	0
Annandale, including Parish of Kirkmichael	James Johnstone of Bodesbeck	Cheviot Tup Silver Medal	0	16	0
	James Brydon, Kinnelhead	do.	3	0	0
	John A. Johnstone, Archbank	do.	1	0	0
	James Johnstone of Bodesbeck	do. Minor Sil. Medal	0	6	0
	John A. Johnstone, Archbank	Cheviot Shearling Tup	3	0	0
	John A. Johnstone, Archbank	do.	1	0	0
	James Johnstone of Bodesbeck	do. Minor Sil. Medal	0	6	0
	Thomas Welsh of Earlshaugh	Cheviot Ewes	1	10	0*
	John Carruthers, Kirkhill	do.	0	10	0*
	Thomas Welsh of Earlshaugh	do. Minor Sil. Medal	0	6	0
	Thomas Welsh of Earlshaugh	Cheviot Gimmers	3	0	0
	James Brydon, Kinnelhead	do.	1	0	0
	James Johnstone of Bodesbeck	do. Minor Sil. Medal	0	6	0
Border Union	Thomas Forster, jun., Ellingham	Border Leicester Tup	3	0	0
	John Lees, Marvingston	do.	1	0	0
	Alexander Bain, Legars	do. Minor Sil. Medal	0	6	0
	John Lees, Marvingston	Border Leicester Shearling Tup	3	0	0
	A. P. Hope, Bordlands	do.	1	0	0
	Thomas Forster, jun., Ellingham	do. Minor Sil. Medal	0	6	0
	John Lees, Marvingston	Border Leicester Gimmers	1	10	0*
	William Purves, Linton Burnfoot	do.	0	10	0*
	William Purves, Linton Burnfoot	do. Minor Sil. Medal	0	6	0
Selkirk	Charles Scott, Nether Phawhope	Cheviot Tup	3	0	0
	John Scott, Deloraine	do.	1	0	0
	William Hall, Midgehope	do. Minor Sil. Medal	0	6	0
	John Scott, Deloraine	Cheviot Shearling Tup	3	0	0
	John Mitchell, Singlie	do.	1	0	0
	Alexander Scott, Ramsaycleuch	do. Minor Sil. Medal	0	6	0
	John Scott, Deloraine	Cheviot Ewes	1	10	0*
	John Mitchell, Singlie	do.	0	10	0*
	Robert R. Fleming, Chapelhope	do. Minor Sil. Medal	0	6	0
	John Scott, Deloraine	Cheviot Gimmers	3	0	0
	John Mitchell, Singlie	do.	1	0	0
	William Hall, Midgehope	do. Minor Sil. Medal	0	6	0
Arran	James Allan, jun., Balnacoole	Blackfaced Tup Minor Sil. Medal	0	6	0
	James Allan, jun., Balnacoole	Blackfaced Shearling Tup Minor Sil. Medal	0	6	0
	James Allan, jun., Balnacoole	Blackfaced Ewes Minor Sil. Medal	0	6	0
	James Allan, jun., Balnacoole	Blackfaced Gimmers Minor Sil. Medal	0	6	0
		Carry forward	L.339	8	0

* Half Premiums awarded, the number of Lots being under four.

NAME OF DIST.	PREMIUM AWARDED TO	FOR		AMOUNT.		
			Brought forward	L.339	8	0
Upper Ward of Lanarkshire	William Hunter, Craighead	Cheviot Tup	Silver Medal	0	16	0
	David Tweedie, Castle Crawford	do.	Minor Sil. Medal	0	6	0
	John Paterson, Howcleuch	Cheviot Shearling Tup	Minor Sil. Medal	0	6	0
	William Hunter, Craighead	Cheviot Ewes	Minor Sil. Medal	0	6	0
	William Hunter, Craighead	Cheviot Gimmers	Minor Sil. Medal	0	6	0
Mull, Coll, and Tyree	Duncan Fletcher of Glenaros*	Blackfaced Tup	Silver Medal	0	16	0
	Duncan Fletcher of Glenaros	do.	Minor Sil. Medal	0	6	0
	Duncan Fletcher of Glenaros	Blackfaced Shearling Tup	Minor Sil. Medal	0	6	0
	John Thomson, Aros Mains	Blackfaced Ewes	Minor Sil. Medal	0	6	0
	John Thomson, Aros Mains	Blackfaced Gimmers	Minor Sil. Medal	0	6	0
West Lothian and Eastern District of Stirlingsh.	James Fleming, Carmuirs	Leicester Tup	Minor Sil. Medal	0	6	0
	James Fleming, Carmuirs	Leicester Shearling Tup	Minor Sil. Medal	0	6	0
	Mrs Peter Reid, Waulkmilton	Leicester Ewes	Minor Sil. Medal	0	6	0
	James Fleming, Carmuirs	Leicester Gimmers	Minor Sil. Medal	0	6	0
Forfar	William White, Spott	Blackfaced Tup	Minor Sil. Medal	0	6	0
	John Edward, Kintrockat	Blackfaced Shearling Tup	Minor Sil. Medal	0	6	0
	Archibald Lindsay, Glenogle	Blackfaced Ewes	Minor Sil. Medal	0	6	0
	D. & J. Smith, Tillydovie	Blackfaced Gimmers	Minor Sil. Medal	0	6	0
				L.345	16	0

DAIRY PRODUCE.

Lorn and Nether Lorn	Charles M'Lean, Penifure	Sweet Milk Cheese		L.2	0	0
	Peter M'Intyre, Barochreal	do.		1	0	0
	J. & J. M'Farlane, Barnacarry	do.	Minor Sil. Medal	0	6	0
	Donald M'Phail, Ardinamar	Cured Butter		2	0	0
	John Campbell, Kilbride	do.		1	0	0
	James Dewar, Kilchattan	do.	Minor Sil. Medal	0	6	0
Wigtown	Gilbert Syminton, Bankfield	Sweet Milk Cheese		2	0	0
	Jnhn M'Camon, Barnhills	do.		1	0	0
	Mathew Hannah, Airies	do.	Minor Sil. Medal	0	6	0
	James Spens, Low Ardwell	Cured Butter		1	0	0*
	Thomas Jamieson, Curghie	do.		0	10	0*
	William M'Clumpha, Auchabrick	do.	Minor Sil. Medal	0	6	0
				L.11	14	0

SPECIAL GRANTS.

Edinburgh Christmas Club	Vote in aid of Premiums,	L.50	0	0
Ayrshire	Vote to Dairy Produce Show at Kilmarnock,	20	0	0
Unst	Vote in aid of Premiums to the Unst Society,	20	0	0
		L.90	0	0

MEDALS IN AID OF PREMIUMS GIVEN BY LOCAL SOCIETIES.

Medium Silver Medals were awarded to the following:—

NAME OF SOCIETY.	MEDAL AWARDED TO	FOR
Auchindoir, Kildrummie, and Towie	Hugh Gordon Lumsden of Auchindoir	Polled Bull
	James Walker, Westside of Brux	Polled Cow
	William Bruce, Mid-Clova	Shorthorn Bull
	Robert Grant of Drumminor	Shorthorn Cow
Buchan	Sir Alex. Bannerman, Bart.	Polled Cow
	Alexander Stephen, Innerveddie	Shorthorn Heifer
Buchan Poultry Association	Mrs Thos. Ferguson, Alton of Coynach	Cured Butter
	Mrs Henderson, Riddinghill	Sweet Milk Cheese

* Half Premiums awarded, the number of Lots being under four.

NAME OF SOCIETY.	MEDAL AWARDED TO	FOR
Cluny	George Stewart, Auchrevie	Farm Management
	Henry Downie, Balvack	Green Crop
	John Gordon of Cluny	Shorthorn Bull
	John Gordon of Cluny	Shorthorn Cow
Cromar, Upper Dee, and Donside	James M'Combie, Daugh	Shorthorn Bull
	James M'Combie, Daugh	Shorthorn Heifer
	Dr Andrew Robertson of Hopewell	Polled Bull
	Marquis of Huntly	Polled Cow
Donside	Sir William Forbes of Craigievar, Bart.	Green Crop
Ebrieside	William Balfour, Pitlochie	Shorthorn Bull
	John S. Yull, Little Ardo	Shorthorn Cow
Formartine	William S. Marr, Upper Mill	Shorthorn Bull
	Alex. Davidson, Mains of Cairnbrogie	Shorthorn Heifer
Fyvie	Alex. Ronaldson, Little Gight	Shorthorn Bull
	William Watson, North Haddo	Draught Mare
Garioch	Sylvester Campbell, Kinnellar	Shorthorn Bull
	William A. Mitchell, Auchnagathle	Shorthorn Cow
	William Macknight, Boghead	Polled Bull
	Peter Beattie, Dunnydeer	Polled Cow
Garioch Turnip Society	James Stephen, Conglass	Swedish Turnips
	William Philip, Lofthillock	Green-topped Yellow Turnips
Keig	Lewis Stewart, Roadside	Dorking Cock and Hen
	Mrs Paterson, Mains of Whitehouse	Fresh Butter
Kincardine-O'Neil and Upper Deeside	Mrs Adam, Inchley	Dorkings
	Mrs Ross, Annesley	Bramahs
	James Philip, Sundayswells	Spanish
	Mrs Adam, Inchley	Cross Chickens
	Mrs Davidson of Desswood	Sweet Milk Cheese
	Mrs Middleton, Campfield	Cured Butter
	Mrs Tocher, Desswood	Oatmeal Cakes
Kinnethmont	William A. Mitchell, Auchnagathle	Shorthorn Bull
	Colonel Leith Hay of Rannes, C.B.	Shorthorn Heifer
Leochel-Cushnie	James Emslie, Cardinston	Polled Bull
	John Hunter, Confunderland	Polled Cow
	James Strachan, Wester Fowlis	Green Crop
North-East Aberdeenshire	Samuel Stewart, Sandhole	Shorthorn Bull
	Samuel Stewart, Sandhole	Shorthorn Cow
	Alex. Milne, Knowehead	Draught Mare
	Mrs Watson, Skalemanca	Butter and Cheese
	James Innes, Mains of Pittulie	Collection of Seeds
	Robert Chapman, Poukburn	Collection of Roots
Strathbogie	James Bruce, Burnside	Shorthorn Bull
	Walter Scott, Glendronach	Shorthorn Heifer
	James Cruickshank, Burnend	Oats
	James Reid, Shanquhar	Roots
Strichen	James Smith, Burnshanghie	Polled Bull
	George Greig, Middlethird	Polled Cow
Turriff	Walter Scott, Glendronach	Shorthorn Bull
	William Mackie, Petty	Shorthorn Cow
	F. W. G. Campbell of Troup	Collection of Oats
	Alex. Bow, Newton	Collection of Turnips
	Mrs Gaul, Whiterashes	Cured Butter
	Mrs Hunter, Reamshill	Sweet Milk Cheese
Warthill	Wm. Leslie of Warthill	Green Crop (Heavy Land)
	Alex. Auld, Newton of Rothmaise	Green Crop (Light Land)

ARGYLLSHIRE.

Kilfinan	Messrs Stewart, Innens	Highland Bull
	C. Macpherson Campbell of Ballimore	Highland Heifer
Kintyre	Peter Clark, Pininver	Ayrshire Bull
	Samuel Mitchell, Dalavaddy	Draught Mare
	Robert A. Hunter, Lephinstrath	Blackfaced Tup
	Alex. Cordiner, Machrimore	Sweet Milk Cheese

AYRSHIRE.

Ardrossan	James Brown, Cartleburn	Ayrshire Bull
	William Caldwell, Boydston	Ayrshire Cow
	Andrew Allan, Munnoch	Cheese
	James Nicol, Craigspark	Cured Butter

NAME OF SOCIETY	MEDAL AWARDED TO	FOR
Carrick	John & Thomas Semple, Glenluie	Ayrshire Bull
	J. N. Fleming of Knockdon	Ayrshire Cow
	Crawford M'Cracken, Moorston	Clydesdale Mare
	John Sloane, Barnhill	Blackfaced Tup
	John Rillie, Pinvalley	Cheviot Tup
	Andrew Gerrand, Burnbank	Sweet Milk Cheese
Cumnock	Hugh Wilson, Auchingibzie	Ayrshire Bull
	Wm. Guthrie, Cumnock	Ayrshire Cow
	George Caldwell, Rottenyard	Sweet Milk Cheese
	Mrs Wm. M'Lannachan, Underwood	Cured Butter
	John Wallace, Treeshill	Collection of Roots
Dalry	Robert Wotherspoon, Kersland	Ayrshire Bull
	Andrew Allan, Munnoch	Ayrshire Cow
Dundonald	Hon. G. R. Vernon, Auchans House	Ayrshire Bull
	William Barbour, Bromhill	Ayrshire Cow
Galston	John Morton, Henryton	Ayrshire Bull
	Alex. Steel, Burnhead	Ayrshire Cow
Kilmarnock	Thomas Donald, Crosstree	Ayrshire Bull
	John Howie, Burnhouses	Ayrshire Cow
Loudoun	John Cameron, Loudounhill	Ayrshire Bull
	George Alston, Loudounhill	Ayrshire Cow
Mauchline	Thomas Borland, Mains	Sweet Milk Cheese
	Thomas Borland, Mains	Dairy Management
	H. Drinnan, Langlands	Collection of Roots
Muirkirk	R. & P. Wardrop, Garlaff	Aryshire Bull
	Hugh Anderson, Townhead	Ayrshire Cow
	Alex. Steel, Burnhead	Clydesdale Mare
	James Craig, Polquheys	Blackfaced Tup
	John Hamilton, Wellwood	Collection of Roots
	Gavin Moffat, Burnfoot	Sweet Milk Cheese
Sorn	James & John Baird, Blindburn	Ayrshire Bull
	Robert Brown, Dalgain	Ayrshire Cow
	Thomas Baird, Blairkip	Cheese
	William Weir, Westown	Cured Butter
	John Watson, Daldorch	Fences
Stewarton	John Brown, Kirkmuir	Ayrshire Bull
	A. R. Foulds of Clerkland	Ayrshire Cow
	John Steven, Kirkwood	Sweet Milk Cheese
	Adam M'Ewen, Parkside	Collection of Roots
Tarbolton	Alex. Ferguson, Clune	Field Produce
West Kilbride	William Dunlop, Fences	Ayrshire Bull
	William Crawford, Campbelton	Ayrshire Cow
	Robert Young, Yonderton	Cheddar Cheese
	William Muir, Pantonville	Cured Butter
	Robert Young, Yonderton	Collection of Roots

BANFFSHIRE.

Central Banffshire	James Garden, Westertown	Sandy Oats
	Robert Turner, Brankanentham	English Berlie Oats
	James Lumsden, Braco	Draught Mare
	Miss Edward, Golden Knowes	Cured Butter
United Banffshire	Andrew Longmore, Rettie	Shorthorn Cow
	Earl of Fife, K.T.	Polled Cow
	Robert Turner, Arradoul	Chevalier Barley
	James Merson, Craigwillie	English Berlie Oats
	James Merson, Craigwillie	Potato Oats
	F. W. G. Campbell of Troup	Longfellow Oats

BUTE.

Bute	James Simpson, Largievrechtan	Ayrshire Cow
	John Stewart, Upper Adroscadale	Leicester Tup
	Robert M'Fie, Lower Ettrick	Green Crop

CAITHNESS-SHIRE.

Caithness	James Henderson of Bilbster	Shorthorn Bull
	James Henderson of Bilbster	Shorthorn Cow
	William Bain, Isauld	Sandy Oats
	George Brock, Greenland	Caithness Bere

NAME OF SOCIETY.	MEDAL AWARDED TO	FOR
	CLACKMANNANSHIRE.	
Clackmannanshire	Miss Stein, Loanside	Hay Crop (Carse)
	John Dawson, Blairhall Mains	Hay Crop (Dryfield)
	Miss Stein, Loanside	Green Crop (Carse)
	Alexander Thomson, Tillicoultry Mains	Green Crop (Dryfield)
	DUMBARTONSHIRE.	
Dumbartonshire	David Riddell, Kilbowie	Clydesdale Entire Colt
	David Riddell, Kilbowie	Clydesdale Filly
	Archibald Coubrough, High Craigton	Blackfaced Tup
	J. W. Burns, Kilmahew	Blackfaced Ewe
Western District of Dumbarton	James & John Galbraith, Edintaggart	Blackfaced Tup
	Duncan M'Farlane, Strone	Blackfaced Ewe
	William Borland, Townfoot	Sweet Milk Cheese
	Thomas Harkness, Mitchellslacks	Cured Butter
Sanquhar	Duncan Campbell Willison, Dalpeddar	Ayrshire Bull
	Abram Kerr, Castlehill	Ayrshire Cow
	Abram Kerr, Castlehill	Draught Mare
	Samuel Irving, Carco	Cheviot Tup
	James Moffat, Gateside	Blackfaced Tup
	EDINBURGHSHIRE.	
Dalkeith	James Lawrie, Mitchelston	Clydesdale Mare
	Duke of Buccleuch, K.G.	Shorthorn Bull
	Duke of Buccleuch, K.G.	Leicester Tup
	Duke of Buccleuch, K.G.	Boar
	James Wilson, Wester Cowden	Turkeys
	James Wilson, Wester Cowden	Potato Oats
	David Denholm, Lingerwood	Chevalier Barley
	William Ford, Hardengreen	Beans
Western District of Mid-Lothian	Robert M. Buchanan, Livingston Mill	Entire Draught Colt
	William Gilbert, Millrig	Draught Mare
	ELGINSHIRE.	
Forres and Northern	Richard Heath Harris, Earnhill	Ox
	George Shand, Ordens	Heifer
	Sir William G. G. Cumming of Altyre, Bart.	Sheep
	James Roger, Gartly	Pig
	William Brown, Linkwood	Collection of Roots
	James Smith, Middlefield	Collection of Seeds
Spey, Avon, and Fiddochside	Sir George Macpherson Grant, Bart.	Barley
	James Skinner, Drumin	Sandy Oats
	William Robertson, Burnside	Longfellow Oats
	Sir George Macpherson Grant, Bart.	Rye Grass Seeds
	FIFESHIRE.	
Kinglassie	David Greig Wallace, Manorleys	Shorthorn Bull
	Thomas Ireland, Kinglassie	Clydesdale Mare
Western District of Fife	Michael Smith, Rosebank Mains	Shorthorn Bull
	Robert Crawford, Balbougie	Draught Mare
	INVERNESS-SHIRE.	
Badenoch and Rothiemurchus	John M'Gillivray, Ballachroan	Highland Bull
	Archibald Campbell, Gaskbeg	Blackfaced Ewe Lambs
Inverness	James Fletcher of Rosehaugh	Shorthorn Bull
	Sir George Macpherson Grant, Bart.	Polled Cow
	James Cumming, Alanfearn	Chevalier Barley
	James Paterson, Knocknagial	Sandy Oats
	James M'Lennan, Cairnglass	Perennial Rye Grass Seed
	Evan Logan, Seafield	White Wheat
	D. G. Ross, Wester Lovat	Turnips
Northern Counties Fat Show	John Cran, Kirkton	Ox
	James Bruce, Burnside	Polled Heifer
	Sir W. G. Gordon Cumming of Altyre, Bart.	Sheep
	John Mackie, Grantown	Pig
	Lady Mackenzie of Gairloch	Poultry
	Duncan Dallas, Inchyettle	Collection of Turnips

NAME OF SOCIETY	MEDAL AWARDED TO	FOR
Strathspey	John Gordon, Culfoichbeg	Shorthorn Bull
	William Allan, Clury	Draught Mare
	Alexander M'Gregor, Burnside	Common Barley
	Charles Grant, Mains of Advie	Sandy Oats
	Alexander Robertson, Wester Lethendry	Perennial Rye Grass
	Dr James Edward, Birchfield	Collection of Roots
	Alexander Mann, Ballintomb	Farm Management
	James Robertson, Balnaclash	Green Crop

KINCARDINESHIRE.

Fettercairn	James Wallace, Balbegno	Shorthorn Bull
	James Smith, Pittengardner	Draught Mare
	William Hogg, Eagle Inn	Turnip Crop
Kincardineshire	John Rae, jun., Haddo	Polled Bull
	T. Gordon Gray, Keabog	Shorthorn Bull
	D. Bremner, Scotston	Draught Mare
	D. Alexander Pearson, Johnston Mains	Green Crop

KINROSS-SHIRE.

Kinross-shire	James Hutton of Waulkmill	Shorthorn Bull
	Robert Hart Anderson, Burleigh	Clydesdale Mare

LANARKSHIRE.

Avondale	John Fleming, Meadowbank	Ayrshire Bull
	John Fleming, Meadowbank	Ayrshire Cow
Bothwell	John Dick, Shirrel	Ayrshire Bull
	Alexander Fleming, Raith	Ayrshire Cow
Cadder	Robert M'Kean, Lumloch	Ayrshire Bull
	Robert Renwick, Gairbraid	Clydesdale Filly
Calder Water	William Young, Whitelaw	Ayrshire Bull
	James Brownlie, Holehouseburn	Clydesdale Entire Colt
Carmunnock	William Young, Waterbank	Ayrshire Bull
	Mrs Fleming, Muirside	Ayrshire Cow
Lanarkshire	William Coats, Blantyre	Ayrshire Cow
	Lawrence Drew, Merryton	Clydesdale Mare

LINLITHGOWSHIRE.

Whitburn	Andrew Morton, Bickerton	Ayrshire Cow
	James Hamilton, Baadsmill	Ayrshire Bull

NAIRNSHIRE.

Nairnshire	Robert Fraser, Brackla	Shorthorn Bull
	John Cran, Kirkton	Shorthorn Cow
	John M'Lennan, Drumornie	Rye Grass Seeds
	Alexander Robertson, Blackhills	Chevalier Barley
	John M'Lennan, Drumornie	Sandy Oats
	James M'Lennan, Fornighty	Collection of Roots
	James Stephen, Meikle Geddes	White Wheat

Broughton	Mrs Fowler, Wrae	Cured Butter
West Linton	Mrs Muir, Robinsland	Sweet Milk Cheese
	Mrs Muir, Robinsland	Cured Butter

Culross	Robert Bennet, Crockmuirhall	Farm Management
	Robert Bennet, Crockmuirhall	Hay
	James Finlayson, Bordie	Turnips
Dunning	Margaret M'Farlane, Kippen	Cured Butter
Middle District of Athole and Tullymet	Robert Conacher, Kincraigie	Green Crop
Moulin	John Stewart, Edradour	Green Crop
Central Strathearn	Robert Gardner, Chapelbank	Clydesdale Mare
	John Whyte, Muirhead	Leicester Shearling Tup
	Henry Drysdale, Mains of Aberdalgie	Common Barley

Upper Strathearn	D. R. Williamson of Lawers	Shorthorn Bull
	Donald M'Intyre, Tighnablair	Blackfaced Tup

RENFREWSHIRE.

Lower Ward of Renfrewshire	Alexander Graham, Blackwater	Ayrshire Bull
	Mrs Douglas, Green	Ayrshire Cow
	Alexander Graham, Blackwater	Blackfaced Tup
	James Moffat & Son, Cornalees	Blackfaced Ewes

ROSS-SHIRE.

Black Isle	James Fletcher of Rosehaugh	Shorthorn Bull
	D. J. M'Rae, Tullich	Shorthorn Heifer
Easter Ross	Captain Grove, Invercharron	Shorthorn Bull
	Mrs Middleton, Fearn	Clydesdale Mare
	A. M. Clarke, Meddat	Chevalier Barley
	George Grant, Pollo	White Essex Wheat
	D. Monro of Allan	Sandy Oats
	John Douglas, Calrossie	Perennial Rye Grass
Wester Ross	Murdo Bethune, Muirton	Clydesdale Stallion
	Alex. Munro, Ord	Draught Mare
	John Hossack, Docharty	Chevalier Barley
	Æneas Adam, Humberston	Wheat
	Murdo Bethune, Muirton	Rye Grass
	Alex. Mackenzie, Kinkell	Sandy Oats

STIRLINGSHIRE.

E. D. of Stirlingshire	David Young, Cowdenhill	Ayrshire Bull
	Ralph Stark of Summerford	Shorthorn Cow
Gargunnock	Alex. M'Gregor, Easter Culmore	Ayrshire Bull
	John Inglis. Kepdarroch	Clydesdale Mare
Stirlingshire	David Dewar, Shaw	Blainslie Oats
	Peter Dewar, King's Park	Scotch Beans
	William Edmund, Cowie	Common Barley
	William Carrick, Baad	Vetches
	Thomas A. Carrick, Easter Cambusdrenny	Hunter's Wheat

SUTHERLANDSHIRE.

North and West of Sutherland	Marshall & Scott, Clebrig	Cheviot Tup
	W. Mitchell, Ribigill	Cheviot Ewes

WIGTOWNSHIRE.

Kirkmaiden	Matthew Kerr, Killumpha	Green Crop

273 Medium Silver Medals, £143, 6s. 6d.

PLOUGHING COMPETITIONS.

In 1872–73 the Society's Minor Silver Medal was awarded at 134 Ploughing Competitions as follows :—

ABERDEENSHIRE.

NO.	NAME OF SOCIETY.	PLACE OF COMPETITION.	SILVER MEDAL AWARDED TO
1.	Aboyne.	Mains of Aboyne.	John Middleton, Gellan.
2.	Ballater.	Milton of Tullich.	James Inch, Scurrystone.
3.	Belhelvie.	Overhill.	Alex. Fiddes, Cothill.
4.	Buchan (Deer District).	Mains of Pitfour.	Andrew Querie, Auchtergills.
5.	Buchan (Fraserburgh Dist.).	Ardmachron.	James Burnett, Strichen Mains.
6.	Coldstone and Migvie.	Hopewell.	John Pringle, Galton
7.	Countesswells.	Culthill.	Robert Fraser, Bishopdams.
8.	Ebrieside.	Overtown.	Alex. Burnett, Littletack.
9.	Fintray.	Fintray Home Farm.	George Rennie, Newhill of Fintray.
10.	Forgue.	Upper Ashalloch.	William Ogg, Westertown.
11.	Fyvie.	Rodshill.	William Charles, Rothie.
12.	Leochel-Cushnie.	Manse of L. Cushnie.	William Law, Calfward.
13.	Mar.	South Auchoncloch.	David Donald, Greenburn.
14.	Muchalls and Cookney.	Muchalls.	James Don, Burnside.
15.	North-East Aberdeenshire.	Coburty.	John Henry, Ardlaw.
16.	Peterculter and Drumoak.	Newton of Drum.	Robert Findlay, Mains of Park.
17.	Strathbogie.	Craigwillie.	William Bremner, Auchmill.
18.	Strichen.	Strichen Home Farm.	George Burnett, Strichen.
19.	Tough and Lynturk.	Tillimair.	James Reid, Blackpool.

ARGYLLSHIRE.

NO.	NAME OF SOCIETY.	PLACE OF COMPETITION.	SILVER MEDAL AWARDED TO
20.	Ardnamurchan.	Achateny.	Duncan Macpherson, Branault.
21.	Glenorchy.	Dalmally.	Peter Dewar, Dalmally.
22.	Kilfinan.	Kames.	John Logan, Otter House.
23.	Killean and Kilcalmonell.	Largie.	Duncan M'Millan, Dalmore.
24.	Kintyre.	Dalrioch.	John Reid, Killellan.
25.	Lorn.	Ferlochan.	Duncan M'Arthur, Barcaldine.
26.	Poltalloch.	Fernoch.	Colin M'Intyre, Fernoch.
27.	Skipness.	Clonaig and Creggan.	John Campbell, Skipness.
		AYRSHIRE.	
28.	Ardrossan.	Woodside.	Robert Brown, junior, Lylestone.
29.	Ayr and Alloway.	Blairston.	James Aird, Doonholm.
30.	Coylton.	Raithill.	John Young, Bridgend.
31.	Cumnock.	Glengyron.	David M'Knight, Barmickhill.
32.	Dalry.	Rysholm.	William Brown, Cartleburn.
33.	Dalrymple.	Woodland.	John Lavery, Mossend.
34.	Fenwick.	Marchbank.	John Gemmell, High Gainford.
35.	Galston.	Galston.	George Hunter, Auchinweet.
36.	Kilmarnock.	Grange Farm.	George Hunter, South Auchinweet.
37.	Kirkmichael.	Orchard.	James M'Kie, Threave.
38.	Mauchline.	Knowehead.	William Morton, Barwheys.
39.	Monkton and Prestwick.	Townhead.	John Hutton, Brocket.
40.	New Cumnock.	Oldmill.	James Calwell, Rottenyard.
41.	Sorn and Dalgain.	Dalgain.	John Sloan, Blairmulloch.
42.	Stewarton.	Bankend.	Robert Stillie, Kirkmuir.
43.	Straiton.	Longcroft.	John Hutchinson, Drumwhill.
44.	Tarbolton.	Coilsfield.	John Strawthorn, Ladyyard.
45.	West Kilbride.	Drumillins.	John Brown, Ardneil.
		BANFFSHIRE.	
46.	Grange.	Fortry.	William Barron, Nethermills.
47.	Morange.	Laggavuch.	Charles Grant, Mullochard.
48.	Strathavon.	Ruthven.	Alex. Innes, Foderletter.
49.	Turriff.	Auldtown of Carnousie.	Peter Anderson, Backhill.
		BERWICKSHIRE.	
50.	Border Union.	Eccles Newton.	Robert Coulter, Wormerlaw.
51.	Cockburnspath.	Blackburn.	James Hardie, Dunglass.
52.	Eccles.	Bartlehill.	George Davidson, Hardacres.
53.	Gordon.	Fawside.	Thomas Purves, East Gordon.
54.	Lauderdale.	Collielaw.	Robert Hill, Bassendean.
55.	Westruther.	Thornidykes.	David Hamilton, Cammerlaws.
		BUTE AND ARRAN.	
56.	Arran.	Claichaig.	Collin M'Gregor, Ballimichael.
57.	Bute.	Culevin.	James M'Alister, Mid Ascog.
		CLACKMANNANSHIRE.	
58.	Hillfoots.	Loanhead.	William Fairnie, Broadcarse.
		DUMBARTONSHIRE.	
59.	Cumbernauld.	Lenrie Mill.	William Steel, Lenrie Mill.
60.	Dumbartonshire.	Silvertonhill.	George Mullins, Ipswich.
61.	Kilmaronock and Bowhill.	Woodside.	John Miller, Dalleith.
		DUMFRIESSHIRE.	
62.	Glencairn.	Shawcastle.	William Weir, Gordiestone.
63.	Keir Parish.	Newmains.	Joseph Kirkpatrick, Boatcroft.
64.	Kirkconnel.	Eastside.	William Dargavel, Burnfoot.
65.	Lochmaben (1872).	Halleaths.	Andrew Tweedie, Redhall.
66.	Lochmaben (1873).	Parkend.	Andrew Tweedie, Redhall.
67.	Mid Nithsdale.	Drumcork.	George Morton, Buswick.
68.	Westerkirk.	Craig.	Alex. Murray, Bailliehill.

EDINBURGHSHIRE.

NO.	NAME OF SOCIETY.	PLACE OF COMPETITION.	SILVER MEDAL AWARDED TO
69.	Cockpen and Newbattle.	Redheuch.	George Smith, Parduvine.
70.	Currie.	Wester Kinleith.	David Somerville, Shothead.
71.	Glencorse.	The Bush.	John Ainslie, The Bush.
72.	Lasswade.	Pentland Mains.	Robert Dickson, Damhead.
73.	Penicuik.	Cuicken.	William Stewart, Mount Lothian.
74.	Temple.	Temple.	John Wilson, Huntliecot.
75.	West Calder.	Brucefield.	John Ritchie, Whitecastle

ELGINSHIRE.

76.	Central Morayshire.	East Grange.	John M'Donald, Thornhill.
77.	Cromdale.	Delchapple.	John Grant, Delchapple.
78.	Dallas.	Torecastle.	Erick M'Kenzie, Hatton.
79.	Dyke.	Darklass.	Alex. M'Kenzie, Earnhill.
80.	Spey, Avon, &c.	Ballindalloch.	Alex. Simpson, Ballindalloch.
81.	Urquhart.	Newton.	James Cramond, Unthank.

FIFESHIRE.

82.	Auchtermuchty.	Wester Cash.	Robert Wallace, Wellfield.
83.	Crossgates.	Trancy.	Andrew Rutherford, Scotswalls.
84.	Dunnikier.	Skeddoway.	William Mitchell, Skeddoway.
85.	Dysart and Wemyss.	Orr Mills.	David Webster, Bowhouse.
86.	Howe of Fife.	Cults.	Alex. Hoy, Newhall.
87.	Largo.	Pilmuir.	Alex. Jack, Buckthorn.
88.	Leslie.	Caskeberran.	James Wann, Caskieberran.
89.	North of Fife.	Cruivie	Andrew Taylor, Myrecairnie.

FORFARSHIRE.

90.	Dundee Mains and Strathmartine.	Strathmartine.	David Murray, Kirton.
91.	Tannadice and Oathlaw.	Meadows.	James Milne, Mains of Ogil.

HADDINGTONSHIRE.

92.	Humbie and Falla.	Chesterhill.	Archd. Howie, Bright Knowe.
93.	Lammermoor.	Harehead.	William Blackie, Elmford.

INVERNESS-SHIRE.

94.	Abernethy.	Lettoch.	John Kennedy, Dell of Abernethy.
95.	Badenoch and Rothiemurchus	Cluny Mains.	Alex. M'Donald, Killiehuntly.
96.	Inverness.	Alturlie of Culloden.	Alex. Falconer, Ballagan.
97.	Strathdearn.	Garbole.	A. Gordon, Dalmigavie.

KINCARDINESHIRE.

98.	Durris.	Balbridie.	George Taylor, Balbridie.
99.	Elsick.	Monduff.	Andrew Paterson, Quocies.
100.	Netherley.	Mountsnaught.	George Laurance, Upper Shachenshaw.
101.	Nigg.	Loirston.	Robert Bridgeford, Craiginches.
102.	Portlethen.	Mains of Badentory.	Joseph Knowles, Blackhills.
103.	Rickarton and Ury.	Wairds of Auquholly.	Andrew Knowles, Cowhill.
104.	Strachan.	Bowbutts.	William Abernethy, Dalbreck.

KINROSS-SHIRE

105.	Fossoway and Aldie	Mawmill.	James Saunders, Keith Hills of Aldie.

STEWARTRY OF KIRKCUDBRIGHT.

106.	Crossmichael.	Mains of Greenlaw.	James Purdie, Wheatcroft.
107.	Glenkens.	Dalarran.	James M'Millan, Glenlee Mains.
108.	Kirkpatrick Durham.	Lairdlaugh.	Archibald Fisher, Doonpark.
109.	New Abbey.	Overton.	David Young, Gibbonhill.
110.	Urr.	Blaiket.	Thomas Waugh, Stonehouse.

LANARKSHIRE.

NO.	NAME OF SOCIETY.	PLACE OF COMPETITION.	SILVER MEDAL AWARDED TO
111.	Cadder.	Lumloch.	James Cameron, Bucklay.
112.	Calder Waterhead.	Hills of Murdoston.	Thomas Denholm, Greenhill.
113.	Carmunnock.	Cathkin.	William Young, Meikle Dripps.
114.	Carstairs.	Netherton.	James Scott, Netherton.
115.	East Kilbride.	Cross.	Alexander Crawford, Dripps.
116.	New Monkland.	Leadmonford.	Gavin Waddell, Arbuckle.
117.	Old Monkland.	Easterhouse.	David Walker, Gartvain.
118.	Wiston and Robertson.	Wiston Mill.	Andrew Todd, Hardington Mains.

LINLITHGOWSHIRE.

119.	Blackburn.	Seafield.	Samuel Neill. Torbanehill.
120.	Kinneil.	Borrowstoun.	George Strathie, Kinneil Kerse.
121.	West Lothian.	North Couston.	George Pate, Balmuir.

NAIRNSHIRE.

122.	Ardclach.	Airdrie.	Robert Stewart, Atnoch.
123.	Nairnshire.	Miltown of Kilravack.	Alexander Falconer, Balagan.
124.	Strathnairn.	Dalgramich.	Donald M'Donald, Dalgramich.

ORKNEY AND SHETLAND.

125.	Shapinshay.	Elwickbank.	John Laughton, Balfour Mains.
126.	South Ronaldshay.	Grutha.	Malcolm Omand, Widewall.
127.	Westmainland.	Kierfiold.	George Anderson, Kierfiold.
128.	Unst.	Ordale.	John Jeffray, Belmont.

PEEBLESSHIRE.

129.	Eddleston.	Portmore.	James Richardson, Milkieston.
130.	Manor.	Woodhouse.	Alexander Shade, Posso.
131.	Newlands Water.	Blaircochran.	William Todd, Macbie Hill.
132.	Newlands Water (open).	Noblehouse.	John Ritchie, Whitecastle.
133.	West Linton.	Ingraston.	John Hutchison, Garvald.

PERTHSHIRE.

134.	Ardoch.	Borland.	William Campbell, Rhind.
135.	Auchterarder and Blackford.	Drumfad.	William Nicol, Cornhill.
136.	Blairdrummond, &c.	Hill o' Drip.	Walter Hallum, Rossburnlane.
137.	Breadalbane (Eastern Dist.).	Comrie Farm.	Peter Anderson, Duneaves.
138.	Breadalbane (Western Dist.).	Kiltyrie.	Peter M'Intyre, Lochearnhead.
139.	Callander.	Wester Brackland.	Alexander Stewart, Boglott.
140.	Comrie and Upper Strathearn.	Drumachork.	Donald Drummond, West Cowden.
141.	Culross.	Shires Mill.	George Spittal, Culross.
142.	Drummond Castle.	Ballochargie.	George Nairn, Mains of Drummond.
143.	Dunblane.	Hungryhill.	Daniel Paterson, Cambushinnie.
144.	Glenalmond.	Francesfield.	Peter Comrie, West Buchanty.
145.	Glengarry and Glenerochy.	Pitdaldonach and Tombane.	John Stewart, Pitdaldonach.
146.	Glenlyon.	Meggernie.	John M'Donald, Kerrumore.
147.	Logie and Lecropt.	Blairmains.	William Stobie, Craigdowings.
148.	Madderty.	Fairneyfold.	Andrew M'Cowan, St David's.
149.	Methven.	Forbrae.	David M'Kay, Methven.
150.	M. D. of Athole and Tullymet.	Dalcapon.	John M'Dougall, Balnafnaran.
151.	Monzievaird and Strowan.	Strowan.	Alexander Jack, Brancroft.
152.	Moulin.	Donavourd.	James Fraser, Drumchorrie.
153.	Port of Monteith.	Grahamston.	James Dougall, Blaircessnock.
154.	Rannoch.	Innerhadden.	Alexander Stewart, Kinloch.
155.	St Martin's.	Balbeggie.	Charles Fenwick, Melginch.
156.	Stormont Union.	Cranley.	William Ramsay, Meikle Fardle.
157.	Strathearn (Central).	Baldinnies.	William Boag, Chapelbank.
158.	Strathord.	Blealoch.	James Malcolm, Farkhill.
159.	Thornhill.	Munnieston.	Robert Dick, Ballochneck.
160.	Trinity Gask.	North Sheriffston.	William Dunn, Chapelhill.
161.	Weem.	Balhomais and Croftnamuick.	John Menzies, Lurgan.

NO.	NAME OF SOCIETY.	PLACE OF COMPETITION.	SILVER MEDAL AWARDED TO
	RENFREWSHIRE.		
162.	Cathcart and Eastwood.	Orchard.	John Pollok, Haugh.
163.	Eaglesham.	Middle Borland.	William Struthers, Wendhill.
164.	Greenock, Gourock, &c.	Divert.	Thomas Crawford, East Kilbride.
165.	Inchinnan.	Inchinnan.	Hugh Craig, Town of Inchinnan.
166.	Kilbarchan.	Locherside.	John White, Nether Craigens.
167.	Kilmalcolm and Port-Glasgow.	Priestside.	James Crawford, Kilbride.
	ROSS-SHIRE.		
168.	Black Isle.	Rosehaugh.	Finlay Campbell, Mains of Tore.
169.	Easter Ross.	Cullisse.	John Stewart, Bogbain.
170.	Lews.	Manor.	Alexander Macpherson, Manor.
171.	Wester Ross.	Conon Mains.	Alexander Denoon, Wester Lovat.
	ROXBURGHSHIRE.		
172.	Lilliesleaf.	Riddell.	Walter Anderson, Adderstonshiels.
173.	West Teviotdale.	Rewcastle	Charles White, Spittal.
	STIRLINGSHIRE.		
174.	Arnprior.	Hillhead.	James Murdoch, Taraben.
175.	Bannockburn, Plean, &c.	West Plean.	John M'Laren, Green Yards.
176.	Craigforth and Touch.	North Kersebony.	John M'Farlane, Shaw of Touch.
177.	Eastern Dist. of Stirlingshire.,	Cobblebrae	Henry Small, Bonnyfield.
178.	Gargunnock.	Byreburn.	Alexander Finlayson, Birkenwood.
	WIGTOWNSHIRE.		
179.	Inch.	Barsolus.	Alexander Lamb, Gallahill.
180.	Kirkmaiden.	Garrochtrie.	John M'Colm, Castle Clanyard.
181.	Machars.	Sorbie.	John M'Kie, Airies
182.	Old Luce.	Kelfillan.	Thomas Kelly, Glenjorrie.
183.	Penningham. &c.,	Meiklecarse.	Robert Moffat, Muirfad.
184.	Stoneykirk.	Kirlauchlin.	John M'Murray, Port o' Spittle.

184 Minor Silver Medals, L.55, 4s.

IV.—COTTAGES AND GARDENS.

1. BEST KEPT COTTAGES AND GARDENS.

ABERDEENSHIRE.

Birse	Archibald Smart	Cottage	L.1 and Minor Silver Medal	L.1	6	0
	Alexander Bowman	do.		0	10	0
	John Collie	do.	Minor Silver Medal	0	6	0
	John Collie	Garden	L.1 and Minor Silver Medal	1	6	0
	Alexander Bowman	do.		0	10	0
	George Birse	do.	Minor Silver Medal	0	6	0
Braemar	Colin M'Intosh	Cottage	L.1 and Minor Silver Medal	1	6	0
	Margaret M'Hardy	do.		0	10	0
	John Eggo	do.	Minor Silver Medal	0	6	0
	Mrs Esson	Garden	L.1 and Minor Silver Medal	1	6	0
	Lauchlan M'Intosh	do.		0	10	0
	Mrs M'Donald	do.	Minor Silver Medal	0	6	0
Cromar	James Robertson	Cottage	L.1 and Minor Silver Medal	1	6	0
	Miss Henderson	do.		0	10	0
	William Cromar	do.	Minor Silver Medal	0	6	0
	James Coutts	Garden		1	0	0
	Miss Henderson	do.		0	10	0
	Gordon Ross	do.	Minor Silver Medal	0	6	0

EDINBURGHSHIRE.

Balerno and Currie	John Ritchie	Garden		1	0	0
	George Anderson	do.		0	10	0
	James Paterson	do.	Minor Silver Medal	0	6	0
Cramond	John Brash	Cottage	L.1 and Minor Silver Medal	1	6	0
	William Murray	do.		0	10	0
	William Horsburgh	do.	Minor Silver Medal	0	6	0
	John Brash	Garden	L.1 and Minor Silver Medal	1	6	0
	Robert Leslie (1st *Prize in* 1872.)	do.	Minor Silver Medal	0	6	0
			Carry forward,	L.17	16	0

LANARKSHIRE.

			Brought forward,	L.17	16	0
Muirkirk	Andrew Millar	Cottage	L.1 and Minor Silver Medal	1	6	0
	James Bryce	do.		0	10	0
	James Reid	do.	Minor Silver Medal	0	6	0
	Joseph Grieve	Garden	L.1 and Minor Silver Medal	1	6	0
	John Gemmell	do.		0	10	0
	John Dunbar	do.	Minor Silver Medal	0	6	0

LINLITHGOWSHIRE.

Dalmeny and Queensferry	Angus Nicolson	Cottage	L.1 and Minor Silver Medal	1	6	0
	David Robertson	do.		0	10	0
	Mrs Proven	do.	Minor Silver Medal	0	6	0
	Andrew Brown	Garden	L.1 and Minor Silver Medal	1	6	0
	John Fulton	do.		0	10	0
	William Allan	do.	Minor Silver Medal	0	6	0
Kirkliston	Mrs Smith	Cottage	L.1 and Minor Silver Medal	1	6	0
	Mrs Borthwick	do.		0	10	0
	Mrs Brown	do.	Minor Silver Medal	0	6	0
	And. Borthwick	Garden	L.1 and Minor Silver Medal	1	6	0
	And. Johnstone	do.		0	10	0
	John Ritchie	do.	Minor Silver Medal	0	6	0

PERTHSHIRE.

Auchterarder	James Hutton	Cottage	L.1 and Minor Silver Medal	1	6	0
	John Whittet	do.		0	10	0
	James M'Culloch	do.	Minor Silver Medal	0	6	0
	Peter Reid	Garden	L.1 and Minor Silver Medal	1	6	0
	John Dingwall	do.		0	10	0
	Robert Dewar	do.	Minor Silver Medal	0	6	0
	James Black (1st *Prize in* 1872.)	do.	Minor Silver Medal	0	6	0
Dunning	James Marshall	do.	L.1 and Minor Silver Medal	1	6	0
	James Duncan	do.		0	10	0
	John Scobie	do.	Minor Silver Medal	0	6	0
Forgandenny	John Tod	do.	L.1 and Minor Silver Medal	1	6	0
	Archd. Fore	do.		0	10	0
	John Richardson	do.	Minor Silver Medal	0	6	0
	James Anderson (1st *Prize in* 1872.)	do.	Minor Silver Medal	0	6	0
Gask	Jessie Leckie	Cottage	L.1 and Minor Silver Medal	1	6	0
	Helen Sime	do.		0	10	0
	Mary M'Carter	do.	Minor Silver Medal	0	6	0
	Mary Alexander	Garden	L.1 and Minor Silver Medal	1	6	0
	George Wilkie	do		0	10	0
	John Penny	do.	Minor Silver Medal	0	6	0
				L.43	12	0

2. MEDALS FOR COTTAGES AND GARDENS AND GARDEN PRODUCE.

Medium Silver Medals were awarded to the following:—

ABERDEENSHIRE.

Cluny	Walter Paterson	Cottage
	James Addison	Garden
Crimonmogate	Mrs Jaffray	Cottage
	Robert Ritchie	Garden
Fintray	John Walker	Cottage
	Mrs Glennie	Garden
Keig	James Wilson	Cottage
	Lewis Stewart	Garden
Kinnellar	Mrs John Duncan	Cottage
	Charles Beaton	Garden

AYRSHIRE.

Mauchline	John Wilson	Garden Produce

DUMBARTONSHIRE.

Vale of Leven and Dumbarton	Donald M'Lachlan	Garden
	John Kerr	Garden

	ELGINSHIRE.	
Mulben	George Davidson	Cottage
	KINCARDINESHIRE.	
Fettercairn	David Carnegie	Garden
	David Prain	Garden
Mearns	James Burgess	Garden Produce
	James Burgess	Garden
	LANARKSHIRE.	
Hutchesontown Gardens	Robert Chalmers	Garden
Shettleston	William Watson	Collection of Flowers
	David Chrichton	Collection of Vegetables
Uddingston	Lawrence Hislop	Cottage
	Thomas Nelson	Garden
Victoria Gardens, Glasgow	James M'Killop	Flower and Vegetable Plot
	LINLITHGOWSHIRE.	
Ecclesmachan	Andrew Masterton	Cottage
	Thomas Ker	Garden
	PEEBLESSHIRE.	
West Linton	James Arrol	Garden
	PERTHSHIRE.	
Logiealmond and Glenalmond	Thomas Fenton	Cottage
	Thomas Fenton	Garden
Sliosgarbh	Ewan Cameron	Garden Produce
Weem and Breadalbane	Donald Cowan	Garden

31 Medium Silver Medals, L.16, 5s. 6d.

V. VETERINARY DEPARTMENT.

A Silver Medal was awarded, at the Annual Examination in April last, to—

Justus Littler, Long Clawson, for best General Examination.

Silver Medals were awarded, at the Class Examination in the Edinburgh Veterinary College, to the following:—

1. Robt. H. Bird, Winchburgh, for best Examination in Anatomy.
2. Andrew Hunter, Newcastle-on-Tyne, and } for best Examination in Cattle Pathology.
3. Justus Littler, Long Clawson, }
4. Justus Littler, Long Clawson, for best Examination in Materia Medica.
5. Justus Littler, Long Clawson, for best Examination in Physiology.
6. Andrew Hunter, Newcastle-on-Tyne, for best Examination in Chemistry.
7. Henry Ashbee, India, for best Examination in Veterinary Medicine and Surgery.

8 Silver Medals, L.6, 8s.

VI. AGRICULTURAL CLASS, EDINBURGH UNIVERSITY.

Henry Erskine, Brechin,		First Prize,	L.6	0	0
David T. Mitchell, Burnton, Laurencekirk, and John Dyer, Edinburgh,	Equal,	Second Prize,	4	0	0
			L.10	0	0

ABSTRACT OF PREMIUMS.

1. ESSAYS AND REPORTS—Money Premiums and Medals,				L.169	8	0
2. STIRLING SHOW—Money Premiums and Medals,				1803	11	6
3. DISTRICT SHOWS:—						
Stock,	L.345	16	0			
Dairy Produce,	11	14	0			
Special Grants—Edinburgh Christmas Club, L.50; Ayrshire Association, L.20; Unst Society, L.20,	90	0	0			
Local Societies—Medals in aid of Premiums, given by (273),	143	6	6			
Ploughing Associations—Medals to (184),	55	4	0			
				646	0	6
4. COTTAGES AND GARDENS—Money Premiums and 42 Minor Silver Medals, L.43, 12s; 31 Medium Silver Medals, L.16, 5s. 6d.,				59	17	6
5. VETERINARY DEPARTMENT—Medals to Students,				6	8	0
6. AGRICULTURAL CHAIR, EDINBURGH UNIVERSITY—Prizes to Class,				10	0	0
				L.2715	5	6

STATE OF THE FUNDS

OF

THE HIGHLAND AND AGRICULTURAL SOCIETY

At 30th NOVEMBER 1873.

I. INVESTMENTS ON BONDS—						
Heritable Bonds,				£12,279	16	0
Railway Debenture Bonds,				10,500	0	0
				£22,779	16	0
II. DEBENTURE STOCK—						
£3,000 North British Railway 4½ per cent. Debenture Stock, at £98, 10s.,				2,955	0	0
III. VALUE OF BANK STOCKS at 30th November 1873—						
£2,218, 6s. 5d. Bank of England Stock, at £248,	£5,501	8	8			
6,102, 7s. 8d. Royal Bank of Scotland Stock, at £198, 10s.,	12,113	4	8			
2,000, 0s. 0d. British Linen Co. Bank Stock, at £270,	5,400	0	0			
1,062, 10s. 0d. Commercial Bank of Scotland Stock, at £298,	3,166	5	0			
1,250, 0s. 0d. National Bank of Scotland Stock, at £297,	3,712	10	0			
				29,893	8	4
Note.—The original cost of these Bank Stocks was £18,154, 9s. 8d., showing a profit at present prices of £11,738, 18s. 8d.						
IV. TEN SHARES (£500) OF THE BRITISH FISHERY SOCIETY, valued at				200	0	0
V. ARREARS OF MEMBERS' SUBSCRIPTIONS, CONSIDERED RECOVERABLE,				38	15	6
VI. SUM DEPOSITED WITH ROYAL BANK,				500	0	0
VII. BALANCE ON ACCOUNT CURRENT WITH ROYAL BANK,				244	11	3
AMOUNT OF FUNDS,				£56,611	11	1
VIII. BUILDING FUND—						
1. Estimated Value of Buildings, No. 3 George IV. Bridge,				£3,100	0	0
2. Sum invested in Railway Debenture Bond,				1,000	0	0
3. Deposit Receipt with Royal Bank of Scotland,				598	5	1
				£4,698	5	1
IX. FURNITURE—						
Estimated Value of Furniture, Paintings, Books, &c.,				£1,000	0	0

W. GIBSON-CRAIG, *Treasurer.*
ANTHONY MURRAY, *Convener of Finance Committee.*
KENNETH MACKENZIE, C.A., *Auditor.*

ABSTRACT of the ACCOUNTS of the HIGHLAND and

CHARGE.

1. Balance due by the Royal Bank of Scotland at 30th November 1872,			£596 15 4
2. Sum deposited with the same Bank on account of Building Fund, .			539 6 8
3. Arrears of Annual Subscriptions outstanding at 30th November 1872, £55, 7s. 6d., and 10s., . .		£55 17 6	
Whereof due by Members compounding for life, and thereby extinguished, £7, 3s. 6d.; since ordered to be written off as irrecoverable, £29, 6s.,		36 9 6	
			19 8 0
4. Arrears of Stall Rents from Kelso Show, ...			9 8 0
5. Medal on hand at 30th November 1872, Medium Silver, . .			0 10 6
6. Income from Investments—			
Interest on Heritable Bonds—			
On £10,979 16 0 at 4 per cent., . . .		£439 3 8	
1,300 0 0 at 4½ per cent., . . .		58 10 0	
£12,279 16 0		£497 13 8	
Less Income Tax, ...		7 0 5	
		£490 13 3	
Interest on Debenture Bonds—			
On £10,500 at 4 per cent., . .	£420 0 0		
Less Income Tax, . .	6 2 0		
		413 18 0	
Interest on £3000 Debenture Stock at 4¼ per cent., ...	£127 10 0		
Less Income Tax, . .	1 16 0		
		125 14 0	
Interest on Bank Account, ...		6 16 7	
Dividends on Bank Stock—			
On £2,218 6 5 Bank of England,	£221 17 7		
6,102 7 8 Royal Bank of Scotland,	533 19 2		
2,000 0 0 British Linen Co. Bank,	260 0 0		
1,062 10 0 Commercial Bank of Scotland, . .	148 15 0		
1,250 0 0 National Bank of Scot.,	181 5 0		
		1,345 16 9	
£12,633 4 1			
Dividend on £500 Stock of the British Fishery Society,		... ...	
Note.—Owing to exceptional circumstances, no Dividend has this year been paid on this Stock.			
			2,382 18 7
7. Income from Building Funds—			
Interest on Debenture Bond for £1000 at 4 per cent., £40, less tax, 11s. 4d., ...		£39 8 8	
Interest on Deposits with Royal Bank of Scotland—			
On £539, 6s. 8d., for half-year to Whitsunday 1873, ...	£9 2 9		
On £568, 3s. 1d., for half-year to Martinmas 1873, ...	10 7 0		
		19 9 9	
			58 18 5
8. Subscriptions—			
Annual Subscriptions, ...		£798 15 0	
Life Subscriptions, ...		916 17 0	
			1,715 12 0
9. Subscriptions to Chemical Department, ...			65 10 0
10. Receipts from Stirling Show (exclusive of premiums), per separate States, ...			1,748 0 1
Sum of Charge,			£7,136 7 7

AGRICULTURAL SOCIETY of SCOTLAND for the YEAR 1872-73.

DISCHARGE.

1. ESTABLISHMENT EXPENSES—		
Salary to Secretary for year to Martinmas 1873,		£850 0 0
Auditor of Accounts,		50 0 0
Clerk, £300, Donation to him, £30, and Junior Clerk, £115, for year to 1st October 1873,		445 0 0
Practical Engineer,		10 0 0
Messenger, £66, and allowance to Widow of former Messenger (five quarters), £26, 5s.,		92 5 0
		£1,447 5 0
Feu-Duty, £28; Taxes, £33, 14s.; and Water-Duty, £1, 10s.,		63 4 0
Coals and Coke, £14, 7s.; Gas, £3, 15s. 4d.; Insurance Premiums, £3, 17s. 6d.,		21 19 10
Repairs, Painting, and Furnishings, £81, 9s. 5d.; Sweeping Vents, 14s.,		82 3 5
		£1,614 12 3
2. AGRICULTURAL CHAIR— Grant to Professor, £150; and Prizes to Class, £10,		160 0 0
3. CHEMICAL DEPARTMENT— Salary to Professor of Chemistry, Glasgow, £300; Assistant for half-year, £75,		375 0 0
4. VETERINARY DEPARTMENT— Allowance to Professor of Veterinary Surgery, £26, 5s.; to Professor of Cattle Pathology, £100; Vote to Professor Balfour for Lecturing, £50; and Medals to Students, £6, 8s.,		182 13 0
5. SOCIETY'S TRANSACTIONS—Printing, Binding, and Circulating Transactions,		431 7 3
6. ORDINARY PRINTING and Lithographing, £119, 17s.; Advertising, £65, 15s. 10d.; Stationery, &c., £44, 7s. 2d.; Postage and Receipt Stamps, £39, 10s.; Bank and Post-Office Charges and Telegrams, £4, 17s. 11d.,		274 7 11
7. TRAVELLING EXPENSES of the Secretary, and Outlays by him attending Meetings at Stirling and Inverness,		8 11 0
8. SUBSCRIPTIONS to Public Societies—Scottish Meteorological Society, £20; Society for Prevention of Cruelty to Animals, £5,		25 0 0
9. MISCELLANEOUS EXPENSES—Reporting General Meetings, £3, 3s.; Handsels, £1, 6s. 6d.; Hire of Van, £2, 5s.; Horse Hire at Trial of Grubbers, £2; Law Charges recovering Arrears, 7s. 6d.; Refreshments to Examiners, £7, 15s.; Re-engraving Medal, 3s. 6d.; Photographs of Scotch Cattle for Japanese Embassy, £5, 2s.,		22 2 6
10. PREMIUMS—		
Glasgow Show, 1867,	£6 2 0	
Kelso Show, 1872,	167 11 0	
Stirling Show, 1873,	1,597 10 6	
District Competitions, 1872,	482 8 0	
Ploughing Competitions, 1872-73,	55 4 0	
Vote to Edinburgh Christmas Club, 1872, £50; Med. Gold Medal, £6, 2s.,	56 2 0	
Vote to Ayrshire Agricultural Society, 1872,	20 0 0	
Essays and Reports, 1872,	193 10 6	
		2,578 8 0
11. AGRICULTURAL AND VETERINARY EDUCATION AND FORESTRY—Fees to Examiners,		44 10 10
12. ARREARS of Subscription struck off as irrecoverable,		38 3 0
13. ARREARS of Subscription considered recoverable,		38 15 6
14. SUM deposited with Royal Bank on Account of Building Fund,		598 5 1
15. SUM deposited with Royal Bank on 13th November,		500 0 0
16. BALANCE in Current Account with Royal Bank,		244 11 3
SUM OF DISCHARGE,		£7,136 7 7

W. GIBSON-CRAIG, *Treasurer.*
ANTHONY MURRAY, *Convener of Finance Committee.*
KENNETH MACKENZIE, C.A., *Auditor.*

EDINBURGH, *7th January* 1874.

ABSTRACT OF ACCOUNTS—

CHARGE.

1. LOCAL SUBSCRIPTIONS—						
Voluntary Assessment on Proprietors—						
Stirlingshire, ...				£453	10	11
Dumbartonshire, ...				144	19	8
Clackmannanshire, ...				53	5	4
Western Division of Perthshire, . . .				42	14	4
				£694	10	3
2. AMOUNT COLLECTED DURING SHOW—						
Drawn at Gates, . . .	£2,630	13	6			
Drawn at Horse Ring, . .	251	2	0			
Catalogues and Awards sold, . .	259	0	0			
				3,140	15	6
3. DRAWINGS AT GATE AT REAPER COMPETITION, £3, 7s., less 5s. to Gatekeeper, ...				3	2	0
4. RENT OF STALLS, ...				942	10	0
5. RENT OF REFRESHMENT BOOTHS,—3 Booths at £40 each,				120	0	0
6. MANURE IN SHOW-YARD SOLD, ...				10	0	0
7. SUM FROM THE COMMISSIONERS OF WOODS AND FORESTS FOR DRAINING PARK, ...				6	0	0
8. FORFEITED DEPOSIT MONEY FOR HORSES, . .				2	0	0
9. INTEREST FROM ROYAL BANK, ...				22	4	2
SUM OF CHARGE, . .				£4,941	1	11

NOTE.—The Premiums undrawn at 30th November 1873 amount to . . .	£206	1	0
From which deduct the above Balance of	150	9	7
Remains probable Deficiency,	£55	11	5

STIRLING SHOW, 1873.

DISCHARGE.

1.	Show-Yard Expenditure— Fitting up, £1,735.—Tenant of Park, £90.—Drainage of Park, £15, 14s.—Poultry Coops, Plans, &c., £31.—Flags, Ropes, Belts, &c., £19, 4s. 5d.—Miscellaneous, £3, 6s., ...				£1,894	4	5
2.	Fodder and Bedding for Stock, . . .				230	17	2
3.	Police Force and Detectives, . . .				57	5	0
4.	Travelling Expenses of Judges, Secretary, &c., .				163	7	6
5.	Hotel and other Bills for Directors, Judges, Secretary, &c.,				298	8	0
6.	Tickets for President's Dinner for do. do., .				19	16	0
7.	Music in Show-Yard, at Dinner, &c., . . .				48	12	6
8.	Printing Catalogues, Awards, &c., and Lithographing Tickets, Badges, &c., ...				274	0	0
9.	Advertising and Posting Bills, . . .				50	8	6
10.	Allowance to Local Secretary, £21—to Practical Engineer, £25, 4s.—and to Local Veterinary Inspector, £10, ...				56	4	0
11.	Expenses in connection with Trial of Reapers, . .				11	6	4
12.	Assistants, Porters, and Attendants, . . .				54	13	0
13.	Postage and Receipt Stamps, ...				29	7	6
14.	Miscellaneous Outlays, ...				4	11	11
	Amount of General Expenses,				£3,193	1	10
15.	Premiums Awarded, . . .	£1,803	11	6			
	Less those still undrawn, . .	206	1	0			
					1,597	10	6
					£4,790	12	4
	Balance,				150	9	7
	Sum Equal to Charge,				£4,941	1	11

W. GIBSON CRAIG, *Treasurer.*
ANTHONY MURRAY, *Convener of Finance Committee.*
KENNETH MACKENZIE, C.A., *Auditor.*

Edinburgh, *7th January* 1874.

ABSTRACTS of the ACCOUNTS of the ARGYLL NAVAL FUND for 1872-73.

CHARGE.

1. FUNDS as at 30th November 1872—						
LOANS—						
On Heritable Bond,				£3,000	0	0
On Debenture Bond by Caledonian Railway Co.,				1,000	0	0
				£4,000	0	0
DEBENTURE STOCK of the North British Railway Co.,				1,200	0	0
BALANCE in Bank at 30th November 1872,				309	17	5
				£5,509	17	5
2. INCOME received—						
On £3,000 Heritable Bond at 4 per cent., £120 ; less Tax, £1, 13s. 10d.,	£118	6	2			
On £1,200 North British Railway Debenture Stock at 4¼ per cent., £51 ; less Tax, 14s. 5d.,	50	5	7			
On £1,000 Debenture Bond by Caledonian Railway Co. at 4 per cent., £40 ; less Tax, 11s. 8d.,	39	8	4			
	£208	0	1			
On Bank Account for Year to 30th November 1873,	3	14	0			
				211	14	1
SUM OF CHARGE,				£5,721	11	6

DISCHARGE.

1. ALLOWANCES to the following Five Recipients—						
Samuel Ewing, eleventh year,				£40	0	0
Everard Ellison Maxwell, tenth year,				40	0	0
George Pirie, seventh year,				40	0	0
Andrew F. Balfour, second year,				40	0	0
Robert J. H. Montgomerie, first year,				40	0	0
				£200	0	0
2. FUNDS as at 30th November 1873—						
LOANS—						
On Heritable Bond,	£3,000	0	0			
On Debenture Bond by Caledonian Railway Co.,	1,000	0	0			
	£4,000	0	0			
DEBENTURE STOCK of the North British Railway Co.,	1,200	0	0			
	£5,200	0	0			
BALANCE in Bank at 30th November 1873,	321	11	6			
				5,521	11	6
SUM EQUAL TO CHARGE,				£5,721	11	6

W. GIBSON CRAIG, *Treasurer.*
ANTHONY MURRAY, *Convener of Finance Committee.*
KENNETH MACKENZIE, C.A., *Auditor.*

EDINBURGH, *7th January* 1874.

APPENDIX (B.)

PREMIUMS

OFFERED BY

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND IN 1874

CONTENTS.

PAGE
General Notice, ... 3
Constitution and Management. 4
Establishment for 1874, ... 5
Committees for 1874, ... 7
Agricultural Education, ... 10
Veterinary Department, ... 14
Forestry Department, ... 17
Chemical Department, ... 19
Instructions for Selecting Samples for Analyses, . . 20
Charges for Analyses, &c., ... 20
General Regulations for Competitors, ... 22

CLASS I.—REPORTS.

§ 1. The Science and Practice of Agriculture—For approved Reports on—

1. What has Chemistry done for Agriculture? 23
2. Agriculture, &c., of the Counties of Edinburgh and Linlithgow, 23
3. Agriculture of the County of Caithness, ... 23
4. Agriculture of the County of Fife, ... 23
5. The Advantage of Ploughing in Manure at once on being spread, 23
6. Manures produced by different kinds of Feeding, . . 24
7. Manure made with and without Cover, ... 24
8. Waste Chemical Products, ... 24
9. Securing Grain Crops in Harvest, ... 24
10. Improved varieties of Agricultural Plants, . . 24
11. Cultivation of Cabbage as a Field Crop, . . . 25
12. Insects which prey upon Agricultural Plants, . . . 25
13. Vegetable Productions of India, China, and America, . . 25
14. Best modes of housing fattening Cattle, . . . 25
15. Different descriptions of Food for Stock, . . . 26
16. The Ayrshire Breed of Cattle, ... 26
17. Disinfecting Agents for Stock, ... 26
18. Carbuncular Fevers in Horses, Cattle, Sheep, and Pigs, . 26
19. Value or otherwise of Inoculation as a preventive of Contagious Pleuro-Pneumonia, ... 27
20. Comparative Return from Capital invested in Cropping, Grazing, or Planting Land on Hill and Moorland, ... 27
21. Management of Land intended to be left in permanent Pasture, 27
22. Management of Grass Land forming part of the Rotation of the Farm, ... 27

PAGE
23. Formation and Management of Water Meadows in England, . 27
24. The advantages to be derived from the use of Traction Engines on Mixed Farms of various sizes. 27
25. Rural Economy Abroad susceptible of being introduced into Scotland, ... 28
§ 2. ESTATE IMPROVEMENTS—FOR APPROVED REPORTS ON—
1. The Cultivation of Land of Inferior Quality by Proprietors or Tenants, ... 28
2. General Improvement of Estates by Proprietors, . . 28
3. Most approved Farm Buildings by Proprietors, . . . 29
4, 5, and 6. Reclamation of Waste Land by Tillage by Proprietors or Tenants, ... 29
7 and 8. Improvement of Natural Pasture without Tillage by Proprietors or Tenants, ... 29
§ 3. MACHINERY—FOR APPROVED REPORTS ON—
1. Invention or improvement of Implements of Husbandry. . 30
2. Machine for Cutting Turf by Steam Power, ... 30
3. Cattle Truck for Feeding and Watering Animals in transit, . 30
§ 4. FORESTRY DEPARTMENT—FOR APPROVED REPORTS ON—
1. Extensive planting by Proprietors, ... 30
2. General management of Plantations by Practical Foresters, . 30
3. Planting on exposed or on Barren Tracts, ... 31
4. Planting on Peat Bog. 31
5. Forest Trees of recent introduction, ... 31
6. Value for economical purposes of Corsican Fir, . 31
7. The Cedrus Deodar, ... 32
8. The Pinus Pinaster or Cluster Pine, ... 32
9. Natural Coppice Wood of other species than Oak, . . 32
10. The effects produced on the various species of Trees and Shrubs by smoke from public works, ... 32
11. Charcoal-producing Plants, ... 32
12. Perthshire Woods, Forests, and Forestry, ... 32
13. Ross-shire Woods, Forests, and Forestry, ... 32
14. Utilisation of Waste Produce of Forests for making an Artificial Fuel, ... 32
15. The Soils and Subsoils suited for Forest Trees, ... 32
CLASS II.—DISTRICT COMPETITIONS.
1. CATTLE, ... 33
2. HORSES, ... 34
3. SHEEP, ... 36
4. SWINE, ... 37
5. DAIRY PRODUCE, ... 37
6. SPECIAL GRANTS, ... 39
7. MEDALS in Aid of Premiums given by Local Societies, . . 39
8. PLOUGHING COMPETITIONS, ... 47
9. COTTAGES AND GARDENS, ... 47
    1. Premiums for best kept Cottages and Gardens, . . 47
    2. Medals for Cottages and Gardens or Garden Produce, . . 50
    3. Improving existing Cottages, ... 51
    4. Building New Cottages, ... 52
GENERAL SHOW AT INVERNESS IN 1874, ... 53
GENERAL SHOW AT GLASGOW IN 1875, ... 72

GENERAL NOTICE.

The Highland Society was instituted in the year 1784, and established by Royal Charter in 1787. Its operation was at first limited to matters connected with the improvement of the Highlands of Scotland; but the supervision of certain departments, proper to that part of the country, having been subsequently committed to special Boards of Management, several of the earlier objects contemplated by the Society were abandoned, while the progress of agriculture led to the adoption of others of a more general character. The exertions of the Society were thus early extended to the whole of Scotland, and have, for the greater part of a century, been directed to the promotion of the science and practice of agriculture in all its branches.

In accordance with this more enlarged sphere of action, the original title of the Society was altered, under a Royal Charter, in 1834, to The Highland and Agricultural Society of Scotland.

The leading purposes of the Institution are set forth in the following pages. where it will be found that Premiums are offered for Reports on almost every subject connected with the cultivation of the soil; the rearing and feeding of stock; the management of the dairy; the improvement of agricultural machinery and implements; the growth of timber; the extension of cottage accommodation; the application of chemical science; and the dissemination of veterinary information.

Among the more important measures which have been effected by the Society are—

1. Agricultural Meetings and General Shows of Stock, Implements, &c., held in the principal towns of Scotland, at which exhibitors from all parts of the United Kingdom are allowed to compete.

2. A system of District Shows instituted for the purposes of improving the breeds of Stock most suitable for different parts of the country, and of aiding and directing the efforts of Local Agricultural Associations.

3. The promotion of Agricultural Education, under powers conferred by a supplementary Royal Charter, granted in 1856, and authorising "The Council of the Highland and Agricultural Society on Education" to grant Diplomas to Students of Agriculture.

4. The advancement of the Veterinary Art, by conferring Certificates on Students who have passed through a prescribed curriculum, and who are found, by public examination, qualified to practise.

5. The appointment of a Board of Examiners, and the granting of First and Second Class Certificates in Forestry.

6. The appointment of a Chemist for the purpose of promoting the application of science to agriculture. Investigations on subjects of importance are conducted in the Laboratory, and published in the Transactions. Members can obtain analyses, reports, and advice, on terms below those charged to others.

7. The annual publication of the Transactions, which comprehend the Prize Reports, proceedings in the Laboratory and reports of experiments, also an abstract of the business at Board and General Meetings, and other communications approved of by the Society.

CONSTITUTION AND MANAGEMENT.

The general business of THE HIGHLAND AND AGRICULTURAL SOCIETY is conducted under the sanction and control of a Royal Charter, which authorises the enactment of Bye-Laws. Business connected with Agricultural Education is conducted under the authority of a Supplementary Royal Charter, also authorising the enactment of Bye-Laws.

The Office-Bearers consist of a President, Four Vice-Presidents, Thirty Ordinary and Ten Extraordinary Directors, a Treasurer, an Honorary and an Acting Secretary, an Auditor, and other Officers. The proceedings of the Directors are reported to General Meetings of the Society, held in January and in June or July.

The Directors meet on the first Wednesday of each month from November to June.

The Council on Education, under the Supplementary Charter, consists of Sixteen Members—Nine nominated by the Charter, and Seven elected by the Society. The Board of Examiners consists of Ten Members.

Candidates for admission to the Society must be proposed by a Member, and are elected at the half-yearly General Meetings in January and June or July. The ordinary subscription is L.1, 3s. 6d. annually, which may be redeemed by one payment, varying, according to the number of previous annual payments, from L.12, 12s. to L.7, 1s. Proprietors farming the whole of their own lands, whose assessment on the Valuation Roll does not exceed L.500 per annum, and all Tenant-Farmers, Office-bearers of Local Agricultural Associations, Resident Agricultural Factors, Land Stewards, Foresters, Agricultural Implement Makers, and Veterinary Surgeons, none of them being also owners of land to an extent exceeding L.500 per annum, are admitted on a subscription of 10s. annually, which may be redeemed by one payment, varying, according to the number of previous annual payments, from L.5, 5s. to L.3. According to the Charter, no Member who homologates his Election by paying his first subscription can retire until he has paid in annual subscriptions, or otherwise, an amount equivalent to a life composition. Members having Candidates to propose are requested to state whether the Candidate should be on the L.1, 3s, 6d. or 10s. list.

Members of the Society receive the Transactions on application, and are entitled to apply for District Premiums—to report Ploughing Matches for the Medal—to attend Shows free of charge, and to exhibit Stock and consult the Chemists at reduced rates.

Orders, payable at the Royal Bank of Scotland, Edinburgh, are issued by the Directors, in name of the parties in whose favour Premiums have been awarded.

All communications must be addressed to "FLETCHER NORTON MENZIES, Esq., Secretary of the Highland and Agricultural Society of Scotland, No. 3 GEORGE IV. BRIDGE, EDINBURGH."

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All communications should be addressed to Fletcher Norton Menzies, Esq. Secretary of the Highland and Agricultural Society of Scotland, No. 3 George IV. Bridge, Edinburgh.

COMMITTEES FOR 1874.

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1. AGRICULTURAL REPORTS.

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,, Anderson, Glasgow.
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Alexander Kinloch, yr. of Gilmerton, Drem.
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John Gibson, Woolmet, Dalkeith.

George Hope of Bordlands, Noblehouse.
James Wilson, Wester Cowden, Dalkeith.
Thomas Mylne, Niddrie Mains, Liberton.
Alexander M'Dougal, Granton Mains, Edinburgh.
Professor Williams, Edinburgh.

SPECIAL COMMITTEES.

1. *Entomological Specimens.*—Robert Scot Skirving, Camptoun, Drem, *Convener;* Professor Wilson; Professor Wyville Thomson; John Wilson, Edington Mains, Chirnside.

2. *Steam Cultivation.*—The Marquis of Tweeddale. *Convener;* the Hon. George Waldegrave Leslie, Leslie House, Ladybank; Sir Thomas Buchan Hepburn of Smeaton, Bart., Prestonkirk; David Stevenson, C.E.; Professor Wilson; J. W. Hunter of Thurston; John Gibson, Woolmet; Thomas Mylne, Niddrie Mains; George Rate, Myreside, Haddington; P. B. Swinton, Holyn Bank; Arthur Glennie, Fernyflatt; James D. Park, Engineer, Edinburgh; Alexander Henderson, Longniddry.

3. *Land Improvement.*—The Marquis of Tweeddale, *Convener;* Charles Smith, Whittingham, Prestonkirk; P. B. Swinton, Holyn Bank, Gifford; Robert Elliot, Laighwood, Dunkeld; Henry Stephens, Redbrae, Edinburgh; Andrew Mitchell, Alloa; Jas. W. Hunter of Thurston, Dunbar.

4. *Transit of Stock.*—Patrick Dudgeon of Cargen, Dumfries. *Convener;* Graham Binny, W.S.; Andrew Gillon of Wallhouse, Bathgate; Alex. Kinloch, yr. of Gilmerton, Drem; R. P. Newton of Castlandhill; John Ord of Muirhouselaw; W. S. Walker of Bowland; Archibald Campbell Swinton of Kimmerghame, Dunse; Alex. F. Irvine of Drum; David Milne Home of Wedderburn.

The President, Vice-Presidents, Treasurer, and Honorary Secretary, are members *ex officio* of all Committees.

AGRICULTURAL EDUCATION.

By a Supplementary Charter under the Great Seal, granted in 1856, the Society is empowered to grant Diplomas.

Members of Council named by Charter.

The President of the Highland and Agricultural Society—*President.*
The Lord Justice-General—*Vice-President.*

The Lord Advocate.
The Dean of Faculty.
The Professor of Agriculture.
The Professor of Anatomy.
The Professor of Botany.
The Professor of Chemistry.
The Professor of Natural History.

Members of Council named by Society.

Sir William Gibson-Craig, Bart.
Sir A. C. R. Gibson Maitland, Bart.
George Hope of Bordlands.
Henry Stephens, Redbrae.
John Wilson, Edington Mains.
Thomas Mylne, Niddrie Mains.

BYE-LAWS ENACTED IN 1866.

I. That, in terms of a Report by the Council on Education, the following Board of Examiners be appointed:—

1. *Science and Practice of Agriculture—Mechanics and Construction.*—Professor Wilson; George Hope of Bordlands; John Wilson, Edington Mains; and Thomas Mylne, Niddrie Mains.
2. *Botany.*—Professor Balfour.
3. *Chemistry*—Professor Anderson.
4. *Natural History.*—Professor Wyville Thomson.
5. *Veterinary Surgery.*—Professor Williams.
6. *Field Engineering and Surveying.*—David Stevenson, C.E.
7. *Book-keeping and Accounts.*—Kenneth Mackenzie, C.A.

II. That the examination shall be both written and oral; that the value of the answers shall be determined by numbers; and that the oral examination shall be public.

III. That there shall be two examinations, to be styled respectively the "Certificate Examination," and the "Diploma Examination." The first to be open to candidates not less than eighteen years of age; the second to those who have completed twenty-one years.

IV. That to pass the "Certificate Examination" a candidate must be acquainted with farm accounts, mensuration, and surveying, and must possess a good knowledge of practical agriculture, and a general acquaintance with the elements of botany, chemistry, and natural history.

V. That a certificate in the following terms, signed by the President or Vice-President of the Council on Education, and by the Secretary, shall be granted to candidates passing this examination:—

"We hereby certify that on the A. B. was examined, and has been found to possess a knowledge of farm accounts, mensuration, and surveying, a good knowledge of practical agriculture, and a general acquaintance with the elements of botany, chemistry, and natural history, and that he is therefore entitled to present himself for the further examination, in terms of the regulations, for the Society's diploma."

VI. That to pass the "Diploma Examination" a candidate must be in possession of the certificate, and have attained his twenty-first year, and must be found to possess a thorough knowledge of the theory and practice of agriculture; of mechanics and mensuration; of the physiology and treatment of domesticated animals; and of the application of botany, chemistry, and natural history to agriculture.

VII. That a diploma in the following terms, bearing the corporate seal of the Society, and signed by the President or Vice-President of the Council on Education, and by the Secretary, shall be granted to candidates passing the second examination:—

"These are to certify that, on the day of A. B. was examined in the arts and sciences connected with agriculture, and has been reported to be proficient therein by a Board of Examiners nominated by the Council of the Highland and Agricultural Society of Scotland on Education, in terms and by authority of a Charter, given under the Great Seal, on the 18th day of August 1856."

VIII. That a sum not exceeding L.100 per annum shall be placed at the disposal of the Examiners, to be applied in prizes to candidates who pass with distinguished merit, and on a standard exceeding that required for the diploma.

BYE-LAW ENACTED IN 1873.

IX. That each successful candidate for the Society's Agricultural Diploma shall thereby become eligible to be elected a free life member of the Society.

The following gentlemen have passed Examinations :—

For Diploma.

1.	Jacob Wilson, Woodhorn Manor, Morpeth,	1858
2.	John Milne, Mains of Laithers, Turriff,	1859
3.	William Henry Eley, Islingham, Frindsbury, Rochester, Kent,	1859
4.	Thomas Rome, Groundslow, Staffordshire,	1859
5.	William Norman, Hall Bank, Aspatria,	1860
6.	George Campbell, Shanes Castle, Antrim,	1861
7.	William B. Smith, Stoneleigh Villa, Leamington,	1862
8.	John R. Hetherington, Carleton, Carlisle,	1862
9.	William Brown, jun., Earlsmill, Forres,	1864
10.	Arthur James Hill, Bath,	1864

For Certificate and Diploma.

(*Under Bye-Laws enacted in* 1866.)

11.	H. R. Goddard, Belsay, Newcastle-on-Tyne,	1866
12.	G. Y. Wall, jun., M.R.A.C., Durham,	1866
13.	Robert Brydon, The Dene, Seaham Harbour,	1867
14.	George Kent Walton, Long Campton, Warwickshire,	1867
15.	Thomas John Elliot, Wilton, Salisbury,	1868
16.	John Gerrard, Veterinary Infirmary, Market Deeping,	1869
17.	Colvile Browne, Long Melford, Suffolk,	1872
18.	A. H. Ashdown, Uppington, Salop,	1872
19.	Adam Ogilvie Torry, St Anne's, Coupar-Angus,	1872
20.	Italo Giglioli, M.R.A.C., Florence,	1873
21.	Edward Charles Munby, M.R.A.C., Clifton Holme, York,	1873
22.	R. F. Juckes, Cotwall, Wellington, Salop,	1873

For Certificate.

(*Under Bye-Laws enacted in* 1866.)

1.	J. C. Bowstead, Halkthorpe Hall, Penrith,	1867
2.	James Taylor, Allan Vale, Pitmuxton,	1868
3.	Forbes Burn, Hardacres, Coldstream,	1872
4.	R. C. Bruce Willis, M.R.A.C., 8 Lansdowne Crescent, Cheltenham,	1873

SYLLABUS OF EXAMINATION.

I.—SCIENCE AND PRACTICE OF AGRICULTURE, MECHANICS, AND CONSTRUCTION.

1. The principles of rotation. Rotations of cropping in most common use for heavy and for light soils.

2. Manures in ordinary use—usual quantities applied per acre—time and mode of application—their composition and relative values and uses.

3. Composition and classification of soils—their agricultural treatment.

4. The various farm crops—their cultivation, general treatment, and marketable value—ordinary produce per acre, and the different modes of storing them.

5. The breeding, rearing, feeding, and humane treatment of the live stock of the farm—the different breeds—their characteristics—the districts where they are principally met with—and also the best and most humane system of horse breaking.

6. Drainage operations.

7. The implements used in agriculture, the points to be attended to in their construction and use, and their prices.

II.—BOTANY.

1. Nutritive Organs of Plants—Root, stem, leaves. Functions of roots. Various kinds of stems, with examples. Use of the stem. Structure of leaves. Different kinds of leaves. Arrangement and functions of leaves.

2. Reproductive Organs—Flower and its parts. Arrangements of the whorls of the flower—calyx, corolla, stamens, pistil. Ovule. Mature pistil or fruit. Pruning and grafting. Seed. Young plant or embryo. Sprouting of the seed, or germination.

3. General Principles of Classification.—Meaning of the terms Class, Order, Genus, Species. Illustrations taken from plants used in agriculture, such as grain-crops, grasses, clovers, vetches, turnips, mangold-wurzel, pease, beans, &c.

Practical Examination in fresh Specimens and Models; some of the latter may be seen in the Museum, at the Royal Botanic Garden, which is open daily to the public, free.

Text-book—Balfour's "Elements of Botany," published by A. & C. Black, 1869. Price 3s. 6d.

III.—CHEMISTRY.

1. Chemistry.

The laws of chemical combination. Atomic theory. Chemistry of the non-metallic elements, and their more important compounds. Potassium, sodium, calcium, magnesium, iron, and their compounds.

Text-book—Roscoe's "Lessons in Elementary Chemistry," published by Macmillan & Co., London. Price 4s. 6d.

2. Agricultural Chemistry.

Composition of Plants. Their organic and inorganic constituents. Composition and characters of fertile soils. The principles of manuring. Composition of farm-yard manure. Artificial manures. Their nature and composition. Principles on which they should be used. Feeding stuffs. Their composition and value, and the mode in which they may be most advantageously employed.

Text-book—Anderson's "Elements of Agricultural Chemistry," published by A. & C. Black, Edinburgh. Price 6s. 6d.

IV.—NATURAL HISTORY.

1. Zoology.

1. The Primary Divisions of the Animal Kingdom, with examples of each.

2. The Vertebrate Kingdom. The peculiarities and functions of the alimentary canal, distinguishing the Ruminants.

3. The Orders—Hymenoptera, Diptera, and Coleoptera—with examples of insects injurious to farm crops belonging to each of the Orders—the preservation of birds which prey upon these insects, drawing a distinction between those which are beneficial and those which are destructive to crops.

2. Geology.

4. The various strata forming the earth's crust in their order of deposition.

5. Their influences on the surface soils of the country.

6. The meaning and application of Disintegration, Drift, Alluvium, Dip, Strike, Fault.

V.—VETERINARY SURGERY.

1. Anatomy of the digestive organs of horse and ox, describing their structural differences.

2. The process of digestion in the above animals, and food most proper for each in quantity and quality.

3. The management of stock before, at, and after parturition. The time of utero-gestation in the domesticated animals.

4. The general principles to be followed in the treatment of very acute disease, before assistance of the veterinary surgeon can be procured.

VI.—FIELD ENGINEERING AND SURVEYING.

1. Land-Surveying with the Chain.
2. Mensuration of Areas of Land, from a Chain Survey or from a Plan.
3. Levelling with the ordinary Levelling Instrument and Staff.

Text books—Any one of the following:—Butler Williams' "Practical Geodesy," published by J. W. Parker, London. Price 8s. 6d. Pages 1 to 20, 24 to 28, 30 to 33, 56 to 59, 118 to 132.

"Cassell on Land-Surveying," published by Cassell, Petter, & Galpin, London; or "Bruff on Land-Surveying," published by Simpkin & Marshall, London; the parts which relate to chain-surveying and ordinary levelling only.

VII.—BOOK-KEEPING AND ACCOUNTS.

1. Questions in practice and proportion.

2. Book-keeping—Describe books to be kept. Give examples—taking of stock.

Text-book—Stephen's "Practical System of Farm Book-keeping," published by Blackwood & Sons, Edinburgh. Price 2s. 6d.

VETERINARY DEPARTMENT.

In the year 1823 the Highland and Agricultural Society instituted lectures in Veterinary Science and Medicine, and arranged with the late Professor Dick to conduct the same.

In 1824 Examinations were commenced and Certificates granted, but only to those Students who attended these lectures. Up to the present time 1023 certificates have been issued.

In June 1859, the Society resolved that the Students of any Veterinary Teacher in Scotland, established under Her Majesty's sign manual, should be eligible for Examination for the Society's Certificate, and they authorised the Examining Board to take on trial any party duly qualified who made application for the Society's Certificate.

In 1870, the Examinations were opened to the Students of any Veterinary Teacher duly recognised by Government; and are now conducted under the following regulations:—

1. There are two examinations yearly—one in April, the other in July.

2. Candidates are allowed to present themselves for examination in Anatomy, Materia Medica, Chemistry, and Botany, nine months after the commencement of their professional studies at a Veterinary College recognised by Government.

3. Candidates who have passed the First Examination, and who have attended at least Two Winter Sessions and One Summer Session at a Veterinary College, are allowed to come up for the Second or Final Examinations, which embrace Histology, Physiology, Cattle Pathology, Horse Pathology, and Clinical Medicine.

4. Candidates must pass a Practical Clinical Examination before they are taken on the subjects enumerated in No. 3.

5. Candidates in entering their names for the Final Examinations must produce Certificates that they have attended a Course of at least Three Sessions at a Veterinary College recognised by Government, and also produce Certificates from the Professor of each subject required by the Curriculum.

6. Candidates failing to pass any of the Examinations are required to attend a Veterinary College one Session before being allowed to present themselves for Re-examination.

The examinations are conducted by leading members of the Medical Faculty and of the Veterinary Profession; and a Certificate bearing the arms of the Society, and signed by the Examiners, is granted to those Students who pass the required Examinations.

The Society, in January 1874, resolved to vote a certain number of Silver Medals to each of the two Veterinary Colleges in Edinburgh, and to the one in Glasgow, for Class Competition; and two Medium Gold Medals, open to all the Students who come up to the April Examination for the Society's Veterinary Certificate for best general and best practical Clinique Examinations.

BOARD OF EXAMINERS—APRIL 1873.

1. *Anatomy and Physiology.*—Dr Dumbreck, Edinburgh; Dr Charles Dycer, Edinburgh; Thomas A. Dollar, V.S., London; C. Cunningham, M.R.C.V.S., Slateford.
2. *Chemistry and Materia Medica.*—Professor Anderson, Glasgow; Professor Balfour, Edinburgh; Finlay Dun, V.S., Weston Park; John Lawson, M.R.C.V.S., Manchester.
3. *Diseases of Horses.*—Thomas Taylor, M.R.C.V.S, Manchester; John Lawson, V.S., Manchester; Daniel M'Lean, M.R.C.V.S., Glasgow; John Borthwick, M.R.C.V.S., Kirkliston.
4. *Diseases of Cattle, Sheep, Dogs, and Swine.*—John Steele, M.R.C.V.S., Biggar; William Aitken, M.R.C.V.S., Kilmarnock: John Dow, V.S., Dunkeld.
5. *Practical Clinique.*—T. A. Dollar, V.S., New Bond Street, London; Thomas Taylor, M.R.C.V.S., Manchester; John Lawson, M.R.C.V.S., Manchester; Daniel M'Lean, M.R.C.V.S., Glasgow; Finlay Dun, V.S., Weston Park, Shipston-on-Stour, Warwickshire; John Steele, M.R.C.V.S., Biggar.

BOARD OF EXAMINERS—JULY 1873.

1. *Anatomy.*—Dr Dycer; Dr Dumbreck; and C. Cunningham, M.R.C.V.S., Slateford.
2. *Botany and Materia Medica.*—Dr Cleghorn, Stravithy, St Andrews; and Daniel M'Lean, M.R.C.V.S., Glasgow.
3. *Chemistry.*—Dr Anderson; and Dr W. Craig, Edinburgh.

SYLLABUS OF VETERINARY EXAMINATION.

ANATOMY AND PHYSIOLOGY.

Anatomy of bones, muscles, blood-vessels, nerves, and viscera of horse, cow, and dog. Description of relative position of parts displayed by various dissections. Demonstration from actual specimens of muscles, tendons, blood-vessels and nerves, of horse's limbs, larynx, eye, &c. Comparative anatomy of veterinary patients.

Minute anatomy of bone, blood, lung, and other tissues of inflammatory products, and of tumours.

Processes of digestion, circulation, respiration, secretion, and excretion. Functions of nervous system and of reproduction.

The breeding, rearing, feeding, and humane treatment of the live stock of the farm—the different breeds—their characteristics—the districts where they are principally met with—and also the best and most humane system of horse breaking.

Text-books—Chauveau's "Comparative Anatomy of the Domesticated Animals," by George Fleming, Veterinary Surgeon, Royal Engineers. Churchill & Sons. L.1, 11s. 6d.

"Lessons in Elementary Physiology," by Thomas H. Huxley, LL.D. and F.R.S. Macmillan & Co. 4s. 6d.

Strangeways' "Anatomy." Maclachlan and Stewart. 17s.

Kirk's "Physiology."

CHEMISTRY AND MATERIA MEDICA.

Elements of inorganic and organic chemistry; physiological chemistry; testing for commoner metals.

Preparation, properties, actions, uses, and doses of medicines. Poisoning in the lower animals, symptoms, post-mortem appearances, antidotes. Writing of prescriptions.

Text books—Roscoe's "Lessons in Elementary Chemistry." Macmillan and Co. Price 4s. 6d.

"Veterinarian's Pocket Conspectus," by Thomas Walley, M.R.C.V.S. Lorimer & Gillies, Edinburgh.

"Veterinary Medicines, their Actions and Uses," by Finlay Dun. Edmonston & Douglas, Edinburgh. 12s. 6d.

BOTANY.

Structure and functions of nutritive and reproductive organs of plants. Natural families of medicinal and poisonous plants. Diseases of agricultural plants caused by fungi.

Text-book—Balfour's "Elements of Botany." A. & C. Black. 3s. 6d.

DISEASES OF HORSES.

Nature, symptoms, post-mortem appearances, causes, treatment, and prevention; accidents; construction and management of stables; shoeing.

Text-books—"Manual of Veterinary Science," by the late William Dick. A. & C. Black.

Percivall's "Hippopathology." 4 vols. L.4, 5s. 6d.

Williams' "Principles and Practice of Veterinary Surgery." Maclachlan & Stewart, Edinburgh. 30s.

DISEASES OF CATTLE, SHEEP, DOGS, AND SWINE.

Nature, symptoms, post-mortem appearances; remedial and preventive treatment; dieteting and general management of domestic animals.

Text-Books—Youatt on "Cattle, Sheep, Pigs, and Dogs."

Blaine's "Principles of Veterinary Art."

Gamgee's "Domesticated Animals in Health and Disease." Fullarton & Co., Edinburgh.

PRACTICAL CLINIQUE

Will include diagnosis orally and in writing of cases of lameness and diseases of horses. Examination of horses as to soundness. Surgical and other operations performed on veterinary patients. Examination, chiefly of morbid specimens, mostly conducted at the abattoirs.

CERTIFICATES IN FORESTRY.

The Society grants First and Second Class Certificates in Forestry and the following Board of Examiners has been appointed:—

1. *Science of Forestry and Practical Management of Woods.*—Dr Cleghorn, Stravithy, St Andrews; John Macgregor, Ladywell, Dunkeld; William M'Corquodale, Scone Palace, Perth; J. Grant Thomson, Grantown, Strathspey.
2. *Elements of Botany.*—Professor Balfour, Edinburgh.
3. *Nature and Properties of Soils, Drainage, and Effects of Climate.*—Professor Wilson, Edinburgh.
4. *Land and Timber Measuring and Surveying; Mechanics and Construction, as applied to Fencing, Drainage, Bridging, and Road-Making; Implements of Forestry.*—A. W. Belfrage, C.E., Edinburgh.
5. *Book-keeping and Accounts.*—Kenneth Mackenzie, C.A., Edinburgh.

Candidates must possess—1*st*, A thorough acquaintance with the details of practical forestry. 2*d*, A general knowledge of the following branches of study, so far as these apply to Forestry:—The Outlines of Botany; the Nature and Properties of Soils, Drainage and Effects of Climate; Land and Timber Measuring and Surveying; Mechanics and Construction, as applied to fencing, draining, bridging, and road-making; Implements of Forestry; Book-keeping and Accounts. The Examinations are open to Candidates of any age.

Passed for First-Class Certificate:—

1. C. F. Bligh, England,	1870
2. George Young Wall, Junior, M.R.A.C., Durham,	1870
3. William Baillie, Forester, Whittingham, East Lothian,	1871
4. William Robertson, Forester's House, Lauder,	1871
5. Peter Loney, Marchmont, Dunse,	1873

SYLLABUS OF EXAMINATION.

I.—SCIENCE OF FORESTRY AND PRACTICAL MANAGEMENT OF WOODS.

1. Formation and ripening of Wood. Predisposing causes of decay.

2 Restoration of Wood-lands:—(1.) Natural reproduction; (2.) Artificial planting.

3. General management of plantations. Cropping by rotation. Trees recommended for different situations.

4. Season and methods of pruning, thinning, and felling.

5. Circumstances unfavourable to the growth of trees.

6. Mechanical appliances for conveying and converting timber. Construction of saw-mills.

7. Qualities and uses of chief indigenous timbers. Processes of preserving timber.

8. Management of nurseries. Seed-sowing.

9. Collection of forest produce.

10. Manufacture of tar and charcoal.

11. Insects injurious to trees — preservation of birds which prey upon them, drawing a distinction between birds which are beneficial and those which are destructive to trees.

II.—ELEMENTS OF BOTANY.

1. Nutritive Organs of plants.—Root, stem, leaves. Functions of roots. Various kinds of stems, with examples. Use of the stem. Structure of leaves. Different kinds of leaves. Arrangement and functions of leaves.

2. Reproductive Organs.—Flower and its parts. Arrangement of the whorls of the flower—calyx, corolla, stamens, pistil. Ovule. Mature pistil or fruit. Pruning and grafting. Seed. Young plant or embryo. Sprouting of the seed or germination.

3. General Principles of Classification.—Meaning of the terms Class, Order, Genus, Species. Illustrations taken from common forest trees and shrubs.

Practical Examination on fresh specimens and models; some of the latter may be seen in the Museum at the Royal Botanic Garden, which is open daily to the public free.

Candidates may consult Professor Balfour's "Elements of Botany," published by A. & C. Black, Edinburgh, 1869. Price 3s. 6d.

III.—NATURE AND PROPERTIES OF SOILS, DRAINAGE AND EFFECTS OF CLIMATE.

1. The different descriptions of soils, their classification, and suitability to growth of different descriptions of timber trees.

2. The composition and constituents of soils. The relations between the soil and trees growing on it.

3. The effects of drainage on soils and on climate.

4. The mode of drainage for plantations.

5. The influence of temperature, rainfall, aspect, shelter, and prevailing winds on tree life.

6. The methods of registering and recording observations, and the instruments used.

IV.—LAND AND TIMBER MEASURING AND SURVEYING; MECHANICS AND CONSTRUCTION AS APPLIED TO FENCING, BRIDGING, AND ROAD-MAKING; IMPLEMENTS OF FORESTRY.

1. The use of the Level and Measuring Chain. Measuring and mapping surface areas.

2. The measurement of solid bodies—as timber, stacked bark, faggots, &c. earthwork.

3. The different modes of fencing and enclosing plantations; their relative advantages, durability, cost of construction, and repairs.

4. The setting out and formation of roads for temporary or permanent use.

5. The construction of bridges over streams and gullies; of gates or other entrances.

6. The different implements and tools used in planting, pruning, felling, barking, and working up timber trees, or preparing them for sale.

Ewart's "Agricultural Assistant." Blackie & Son, Glasgow and Edinburgh. Price 3s. 6d.

Strachan's "Agricultural Tables." Oliver & Boyd, Edinburgh. Price 2s. 6d.

V.—BOOK-KEEPING AND ACCOUNTS.

1. Questions in practice and proportion.

2. Book-keeping—describe books to be kept; give examples. Taking of stock.

CHEMICAL DEPARTMENT.

Chemist.—Prof. ANDERSON, Chemical Laboratory, University, Glasgow.
Assistant Chemist.— Mr JAMES DEWAR, The Laboratory, Veterinary College, Edinburgh.

The objects of the Chemical Department are fourfold :—

I. The prosecution of researches in various subjects connected with Agricultural Chemistry, the results of which are published at intervals in the Transactions.

The Chemists will be glad at all times to receive suggestions from Members of the Society regarding subjects they may consider worthy of investigation, and which will be laid before the Chemical Committee.

II. To assist in the performance of minute and accurate Field Experiments.

For this purpose it was resolved to institute field experiments on a systematic plan, and in such a manner as to obtain exact and comparable results. These experiments, as now arranged, are to be carried out under the personal superintendence and inspection of the assistant chemist in a limited number of districts, where a local committee of members make application for them and will contribute two-thirds of the expenses incurred. The nature and extent of such experiments to be determined by the Directors. Members who have any suggestions to make regarding subjects deserving investigation are requested to communicate with Dr Anderson or Mr Dewar.

III. District Lectures.

Lectures by the assistant chemist will be given in a limited number of districts on application from a local committee of members and on payment of L.2, 2s. for each lecture in addition to travelling expenses. If three lectures be given on consecutive days the fee to be L.5, 5s. for the course.

IV. The performance of Analyses of Manures, Soils, Vegetable Products, &c., for Members of the Society at reduced fees.

In purchasing manures, cattle foods, &c., Members are recommended, in all cases, to do so by guaranteed analyses, and to ascertain that the article delivered corresponds with it. Partial analyses, such as Nos. 6 and 7 of the accompanying list, will generally suffice to check the correspondence of the stock with the guarantee, and give an *approximate*, though not a precise, estimate of its value. When an *exact* estimate is required, a complete analysis is necessary.

Samples intended for analysis should be sent (carriage paid) addressed to Dr ANDERSON, CHEMICAL LABORATORY, UNIVERSITY, GLASGOW, or Mr JAMES DEWAR, THE LABORATORY, VETERINARY COLLEGE, EDINBURGH, and when of small size, they are most cheaply and expeditiously forwarded *by post*. They should be distinctly labelled, marked with the name and address of the sender in full, and accompanied by a letter specifying the particular analysis required, according to its number in the following list,—and, if possible, the object in view,—as, by doing so, much trouble and delay will occasionally be saved.

Some inconvenience having been experienced by persons sending samples for analysis which had not been selected with sufficient care, and were afterwards found not to represent the average composition of the substance, it is particularly requested that the following instructions may be attended to as closely as circumstances will permit.

INSTRUCTIONS FOR SELECTING SAMPLES FOR ANALYSIS.

Manures.—A large double handful of the Manure should be taken from each of *at least* five or six different bags; and if any lumps are found in it, a due proportion of these should also be taken. The whole being laid on a large sheet of paper, should be carefully mixed by rubbing with the hand, the lumps being broken down and mixed as uniformly as possible with the powdery part. If this mixture be carefully made, a quantity of it, not exceeding *two ounces*, will suffice for the analysis. It should be folded up in tinfoil to prevent its becoming dry. In default of tinfoil, the sample may be wrapped in double folds of strong writing paper. Should the manure contain stones, or be very moist, or should any difficulty be experienced in making a uniform mixture, it is desirable that *two or three pounds* should be sent.

Soils.—In selecting Soils for analysis, five or six spadefuls should be taken from different parts of the field, and after being spread out in a thin layer for several days to dry, should be put two or three times through a fine sieve, so as to ensure uniform mixture. For a complete analysis, not less than *two pounds* should be sent; for a partial analysis, three or four ounces will be sufficient.

Waters—For the complete analysis of a Water, from *two to three gallons* are required; for the determination of the amount of salts in solution, and lime thrown down by boiling, *two quarts* will suffice. A well water may be selected at any time, but the water of a spring or running stream should be taken in dry weather. The jars or bottles in which they are sent must be tightly corked and sealed. In the analysis of a mineral water, it may sometimes be desirable to determine the amount of gases held in solution, in which case certain precautions must be observed which require the presence of a chemist at the spring.

Limestones, Clays, Ironstones, &c—If the bed of any of these substances of which the analysis is required be very uniform in appearance, a piece of two or three ounces weight taken from any part of it will be enough for analysis; but in all cases it is better to send three or four chips from different parts of its thickness. Sometimes, where the character of different parts of the bed vary much, separate analysis of these portions may be requisite, in which case two ounces of each may be sent.

The following are the rates at which analyses, &c., are furnished to *Members of the Society*, and it is requested that the fee be remitted along with the nple :—

1. Complete analysis of a Soil, including determination of Alkalies and Phosphates, L 3.
2. A partial analysis of a Soil, such as the determination of the quantity of Organic Matter, and relative proportion of Clay, Sand, and Carbonate of Lime it contains, 10s.
3. Quantitative determination of any one ingredient of a Soil, 7s. 6d.
4. Complete analysis of Saline Manures and other substances, such as Gypsum, Nitrates of Soda and Potash, Ammoniacal Salts, Guano, Oil-cake, Bone-dust, Rape-dust, Superphosphate of Lime, L.1.
5. Testing the above substances for adulterations—for each sample, 5s.

   This examination is generally sufficient to determine whether or not any of these substances are grossly adulterated, but it gives no idea of the comparative value of different Samples, where all are genuine.
6. Determination of the percentage of Phosphates and Ammonia in a Guano, 10s.
7. Determining the Quality of Soluble and Insoluble Phosphates in a Superphosphate, 10s.

   This and the preceding determination generally suffice to show whether the sample is of fair quality, and corresponds with the analysis by which it was sold, but not to fix its exact commercial value.

8. Complete analysis of Limestone, Marl, Shell-Sand, &c., L.1.
9. Examining any of the above substances for the quantity of Lime, and ascertaining in the same the presence of Magnesia and Alumina, 7s. 6d. Ascertaining the proportion of these, 2s. 6d. additional for each substance.
10. Complete analysis of the Ash of any Plant, L.3.
11. Complete analysis of a Water, L.2.
12. Determination of the Amount of Salts in Solution, and of the Lime thrown down by boiling in any water, 10s.
13. Analysis of Tile or Fire Clay, L.1, 10s.
14. Complete analysis of Roots, Grains, and other Vegetable Products, L.1.
15. Examining products of Vegetation, or of the Dairy, such as Nutritive Matters in Wheat, or other Grain—quantity of Butter or Cheese in Milk—5s. for each ingredient.
16. Determination of the quantity of Nitrogen in any substance, 7s. 6d.
17. Answers to letters asking advice on subjects within the department of the chemist, 5s.

The charges for other Analyses not specified in the list will be settled by the Committee of Management, with reference to the amount of work which they involve, and on a scale similar to the above.

PREMIUMS.

GENERAL REGULATIONS FOR COMPETITORS.

All Reports must be legibly written, and on one side of the paper only; they must specify the number and subject of the Premium for which they are in competition; they must bear a distinguishing motto, and be accompanied by a sealed letter similarly marked, containing the name and address of the Reporter—initials must not be used.

No sealed letter, unless belonging to a Report found entitled to at least one-half of the Premium offered, will be opened without the author's consent.

Reports, for which a Premium, or one-half of it, has been awarded, become the property of the Society, and cannot be published, in whole or in part, nor circulated in any manner, without the consent of the Directors. All other papers will be returned to the authors, if applied for within twelve months.

When a Report is unsatisfactory, the Society is not bound to award the whole or any part of a Premium.

All Reports must be of a practical character, containing the results of the writer's own observation or experiment, and the special conditions attached to each Premium must be strictly fulfilled. General essays, and papers compiled from books, will not be rewarded. Weights and measurements must be indicated by the imperial standards.

The Directors, before awarding a Premium, shall have power to require the writer of any Report to verify the statements made in it.

The decisions of the Board of Directors are final and conclusive as to all Premiums, whether for Reports or at General or District Shows; and it shall not be competent to raise any question or appeal touching such decisions before any other tribunal.

Reports on subjects not included in the Premium List will be received, and honorary rewards will be given when merited.

CLASS I.

REPORTS.

SECTION 1.—THE SCIENCE AND PRACTICE OF AGRICULTURE.

FOR APPROVED REPORTS.

1. On What has Chemistry done for Agriculture by improving or increasing the produce of the soil?—Fifty Sovereigns. To be lodged by 1st November 1874.

2. On the Agriculture of the Counties of Edinburgh and Linlithgow, and the industrial progress and development of these Counties during recent years—Thirty Sovereigns. To be lodged by 1st November 1874.

> The Report should embrace full details of the different systems of Farm Management observed in the Counties, and of the progress which Agriculture and other industries have made within the last 25 years.

3. On the Agriculture of the County of Caithness—Thirty Sovereigns. To be lodged by 1st November 1874.

> The Report should embrace full details of the different systems of Farm Management observed in the County, and of the progress which Agriculture has made within the last 25 years.

4. On the Agriculture of the County of Fife—Thirty Sovereigns. To be lodged by 1st November 1874.

> The Report should embrace full details of the different systems of Farm Management observed in the County, and of the progress which Agriculture and other industries have made within the last 25 years.

5. On the comparative advantages in Scotland of Ploughing in Manure in autumn or winter immediately after it is spread on the land, or of allowing it to remain on the ground for some weeks before it is covered—The Medium Gold Medal, or FIVE Sovereigns. To be lodged by 1st November 1874.

6. On the results of experiments for ascertaining the comparative value of farm-yard manure, obtained from cattle fed upon different varieties of food, by the application of such manures to farm crops—Twenty Sovereigns. To be lodged by 1st November in any year.

The Report must state the effects produced on two successive crops by the application of manure obtained from cattle fed on different sorts of food, such as turnips and straw alone; and turnips and straw, with an addition of oil-cake, linseed, bean-meal, grain, or other substances. The animals should be as nearly as possible of the same age, weight, condition, and maturity, and each lot should receive daily the same quantity of litter; and, except as to the difference of food, they must be treated alike.

The preparation of the manure, by fermentation or otherwise, should be in every respect the same; and it is desirable that not less than two several experiments be made with each kind, and that the ground to which it is to be applied be as equal as possible in quality and condition.

7. On the comparative value of Manure made in the ordinary manner, and of Manure kept under cover till applied to the Land—Twenty Sovereigns. To be lodged by 1st November in any year.

The experiment may be conducted either with manure made in the open straw-yard, contrasted with that made in covered hammels or boxes, or with manure made in feeding houses, part of which shall have been placed under cover, and part removed to the open dung-pit, and kept carefully unmixed with any other manure. Preference will be given to experiments embracing both of these modes. The cattle must be fed and littered alike. There must be at least an acre of land experimented on with each sort of manure—the different lots must be manured to the same extent, and be equal in soil, and the crops must be accurately weighed and measured on two separate portions of each lot, not less than 20 poles. The result, as given by two successive crops, to be reported.

8. On the Waste Chemical Products, and new combination of substances which might be made available for agricultural purposes—Twenty Sovereigns. To be lodged by 1st November 1874.

9. On any new practical mode of securing the grain crops in harvest—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November 1874.

10. On the means successfully employed for obtaining new Agricultural Plants or new and superior varieties, or improved sub-varieties, of any of the cereal grains, grasses, roots, or other agricultural plants at present cultivated in this country—Medals

or Sums of Money not exceeding L.50. To be lodged by 1st November 1874.

It is necessary that the varieties and sub-varieties reported upon shall have been proved capable of reproduction from seed, and also that the relation they bear to others, or well-known sorts, should be stated. The reporter is further requested to mention the effects that he may have observed produced by different soils, manures, &c., on the plants forming the subjects of report, and how far he may have ascertained such effects to be lasting.

Should any improved variety reported upon be the result of direct experiment by cross impregnation, involving expense and long-continued attention, a higher premium will be awarded.

11. On the cultivation of the Cabbage as a field crop—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November 1874.

The experiment must be conducted on not less than one acre, and contrasted with a like extent under turnips in the same field. Both lots must have been under one rotation, and must be prepared and manured in the same manner.

12. On the Insects which prey upon Agricultural Plants, and the diseases occasioned by them, and the best means of prevention—Twenty Sovereigns. To be lodged by 1st November 1874.

13. On the hardy and useful Herbaceous Plants of any country where such climate exists, as to induce the belief that the plants may be beneficially introduced into the cultivation of Scotland—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November in any year.

Attention is particularly directed to the Grains and Grasses of China, Japan, the Islands of the Eastern Archipelago, the Himalaya country, the Falkland and South Sea Islands, California, and the high north-western districts of America.

Reporters are required to give the generic and specific names of the plants treated of, with the authority for the same—together with the native names, so far as known; and to state the elevation of the locality and nature of the soil in which they are cultivated, or which they naturally inhabit, with their qualities or uses; and it is further requested that the descriptions be accompanied, in so far as possible, with specimens of the plants, and their fruit, seed, or other products.

14. On the comparative advantages of fattening Cattle in stalls, in loose houses or boxes, and in sheds or hammels—Twenty Sovereigns. To be lodged by 1st November in any year.

The Report must detail the comparative result of actual experiments. The same quantities and kinds of food must be used. Information is required as to the comparative expense of attendance, the cost of erecting the buildings, and any other circumstances deserving of attention. The state of the weather during the experiment, in point of temperature and wetness, must be particularly noted and reported.*

15. On experiments for ascertaining the actual addition of weight to growing or fattening Stock, by the use of different kinds of food—Twenty Sovereigns. To be lodged by 1st November in any year.

The attention of the experimenter is directed to turnips, carrots, beet, mangold wurzel, potatoes, cabbage, as well as to beans, oats, barley, Indian corn, linseed, oil-cake or rape-cake, and to the effect of warmth and proper ventilation, and the difference between food cooked and raw. The above roots and other kinds of food are merely suggested; competitors are neither restricted to them nor obliged to experiment on all of them.

When experiments are made with linseed and cake, attention should be paid to the comparative advantages, economically and otherwise, of the substances in these two states.

Before commencing the comparative experiments, the animals must be fed alike for some time previously.

The progress of different breeds may be compared. This will form an interesting experiment of itself, for reports of which encouragement will be given.*

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* The experiments specified in Nos. 14 and 15 must be conducted over a period of not less than three months. No lot shall consist of fewer than four Cattle or ten Sheep. The animals selected should be of the same age, sex, and breed, and, as nearly as possible, of the same weight, condition, and maturity. The live weight before and after the experiment must be stated, and, if killed, their dead weight and quantity of tallow.

16. On the Ayrshire Breed of Cattle, and the means that have been or might be used for its improvement—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November 1874.

17. On Disinfecting Agents for preventing attacks of Cattle Plague and Pleuro-Pneumonia, or in extirpating these diseases when they have appeared—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November 1874.

18. On the causes of the Septic, Anthrax, or Carbuncular Fevers which prevail in Great Britain amongst Horses, Cattle, Sheep, and Pigs—Fifteen Sovereigns. To be lodged by 1st November 1874.

The Report must state the causes which induce them, having particular reference to the influences of diet, heat, cold, moisture, drainage, ventilation, &c., as well as to the soil upon which they are most commonly found; also whether they are contagious or in any way capable of propagation from one animal to another, not only of the same but of a different species; if the flesh of cattle, sheep, and pigs slaughtered in any stages of the disease is fit for human food; and, finally, to draw a comparison between the maladies and any forms of disease affecting the human race.

19. On the value or otherwise of Inoculation as a preventive of Contagious Pleuro-Pneumonia—Ten Sovereigns. Reports to be lodged by 1st November 1874.

20. On the comparative return from Capital invested in Cropping, Grazing, or Planting land upon hill and moorland—Twenty Sovereigns. Reports to be lodged by 1st November 1874.

The subject to have reference not only to immediate return upon capital expended, but also to be considered in relation to the amelioration of the soil, climate, and prospective enhancement of value thereby.

21. On the best mode of cultivating Grass in Scotland under rotation—Twenty Sovereigns. Reports to be lodged by 1st November 1874.

The Reporter is specially to direct his attention to the system often adopted in the management of farms hitherto worked upon the five years' rotation, arising from the longer period under which land is now being left in grass. The best modes of preparing land for sowing out, as well as its management during three or four years in grass, to be considered; also the extent to which on the average of Scotch farms the diminished average under turnip may be compensated by a heavier yield of crop per acre over the whole rotation.

22. On the management of the best Pasture Districts in England, and how far such management is applicable to Scotland—Twenty Sovereigns. To be lodged by 1st November 1875.

The Report should state the nature of the soil and subsoil—the condition of the land as regards drainage, the rotation of crops and system of management of the lands previous to being sown with grass seeds; the cultivation necessary before sowing out to grass, and whether the grass seeds should be sown with a corn crop or without; the quantities and kinds of grass and clover seeds sown; the locality in which the land is situated; the average rain-fall and temperature of the district; the letting value of the land while under a rotation of crops, and its letting value as pasture after being five years in grass.

23. On the formation and management of Water Meadows in England, and how far the system there pursued is applicable to Scotland.—Twenty Sovereigns. To be lodged by 1st November 1874.

The Reporter must refer to the value of the irrigated land or water meadows in England as compared with land of the same quality under rotation of crop.

24. On the advantages to be derived from the use of Traction Engines, in point of economy and expediency, upon mixed farms of various sizes, soil, &c.—Twenty Sovereigns. To be lodged by 1st November 1874.

Reports to be verified by reference to the place or places from which the writer has derived his experience, and must embrace cost, cost of working, adaptability of engine to various departments upon farms, saving in point of expense and time, and details as to proposed uses of traction engines at various seasons on a mixed farm.

25. On any useful practice in Rural Economy adopted in other countries, and susceptible of being introduced with advantage into Scotland—The Gold Medal. To be lodged by 1st November in any year.

The purpose chiefly contemplated by the offer of this premium is to induce travellers to notice and record such particular practices as may seem calculated to benefit Scotland. The Report to be founded on personal observation.

SECTION 2.—ESTATE IMPROVEMENTS.

FOR APPROVED REPORTS.

1. By a Proprietor or Tenant in Scotland on the cultivation of not less than 150 imperial acres of land of inferior quality—First Premium, L.200; Second, L.150. Intimation of intention to compete to be lodged by 1st November 1874.

The operations to be reported on must be commenced not later than the autumn of 1874—be conducted on a farm of at least 150 acres imperial—extend over a period of not less than 5 or 6 years—and embrace a complete rotation of crops.

The Society will appoint a Committee who shall determine if the land is of the class referred to. The Committee shall periodically inspect the operations, and shall have power to call for information on any point they may consider necessary. They shall not in any way interfere with the system of management pursued, nor make any suggestions, but shall take their own notes so as to be able to check the statements made in the Report.

The Report must detail the previous state of the land and the system of cultivation pursued thereon, if any—the nature of the soil and sub-soil—the whole operations carried on, including trenching, draining, liming, fencing, road-making, &c., during the rotation, and the cost thereof—the quantity and cost of all seed and manure applied—the produce of each crop—and the kind and quantity of live stock kept. Classified abstracts of the whole expenditure and return for each year must also be given.

2. By the Proprietor in Scotland who shall have executed the most judicious, successful, and extensive improvement—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November in any year.

Should the successful Report be written for the Proprietor by his resident factor or farm manager, a Medium Gold Medal will be awarded to the writer in addition to the Gold Medal to the Proprietor.

The merits of the Report will not be determined so much by the mere extent of the improvements as by their character and relation to the size of the property. The improvements may comprise reclaiming, draining, enclosing, planting, road-making, building, and all other operations proper to landed estates. The period within which the operations may have been conducted is not limited, except that it must not exceed the term of the reporter's proprietorship.

3. By the Proprietor in Scotland who shall have erected on his estate the most approved Farm-buildings—The Gold Medal. Reports, Plans, and Specifications to be lodged by the 1st November in any year.

4. By the Proprietor or Tenant in Scotland who shall have reclaimed within the ten preceding years not less than forty acres of waste land—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November in any year.

5. By the Tenant in Scotland who shall have reclaimed within the ten preceding years not less than twenty acres of waste land—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November in any year.

6. By the Tenant in Scotland who shall have reclaimed not less than ten acres within a similar period—The Medium Gold Medal, or Five Sovereigns. To be lodged by 1st November in any year.

The Reports in competition for Nos. 4, 5, and 6 may comprehend such general observations on the improvement of waste lands as the writer's experience may lead him to make, but must refer especially to the lands reclaimed—to the nature of the soil—the previous state and probable value of the subject—the obstacles opposed to its improvement—the details of the various operations—the mode of cultivation adopted—and the produce and value of the crops produced. As the required extent cannot be made up of different patches of land, the improvement must have relation to one subject; it must be of a profitable character, and a rotation of crops must have been concluded before the date of the report. *A detailed statement of the expenditure and return*, and a certified measurement of the ground, are requisite.

7. By the Proprietor or Tenant in Scotland who shall have improved within the ten preceding years the pasturage of not less than thirty acres, by means of top-dressing, draining, or otherwise without tillage, in situations where tillage may be inexpedient—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November in any year.

8. By the Tenant in Scotland who shall have improved not less than ten acres within a similar period—The Minor Gold Medal. To be lodged by 1st November in any year.

Reports in competition for Nos 7 and 8 must state the particular mode of management adopted, the substances applied, the elevation and nature of the soil, its previous natural products, and the changes produced.

SECTION 3.—MACHINERY.

FOR APPROVED REPORTS.

1. On such inventions or improvements, by the reporters, of any implement or machine as shall be deemed by the Society of public utility—Medals, or sums of money not exceeding Fifty Sovereigns. To be lodged at any time.

Reports should be accompanied by drawings and descriptions of the implement or machine, and, if necessary, by a model.

2. On a machine for cutting or condensing turf or peat by steam or horse power—Twenty Sovereigns. To be lodged by 1st November 1874.

3. On the best and most approved Cattle Truck for feeding and watering the animals in transit—Twenty Sovereigns. To be lodged by 1st November 1874.

Reports must be accompanied with drawings and descriptions, or, if necessary, by a model.

SECTION 4.—FORESTRY DEPARTMENT.

FOR APPROVED REPORTS.

1. By a Proprietor in Scotland who shall, within the five preceding years, have planted not less than 150 acres—The Gold Medal. To be lodged by 1st November in any year.

The whole planting operations which may have been conducted by the reporter within the five years, whether completed or not, must be embraced, and he must state the expense—description of soil—age, kind, and number of trees planted per acre—mode of planting, draining, and fencing—general state of the plantation—and any other observations of interest.

2. By a Practical Forester, of the management of Plantations from the commencement of the first thinning till the period of yielding full-grown timber—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November in any year.

The Report must embrace the following points:—The progress of the different sorts of trees—the effects of altitude and exposure—the general advantages of shelter—the mode of thinning and pruning adopted—the uses and value of the thinnings—the plan of registry and of valuing, or a specimen of the method in which the forester's book is kept—the valuation at the time of the report—together with such general remarks as may be thought useful.

The Report is not expected to embrace the formation and early management, farther than the description of soil, kinds of plants, whether mixed or in masses, together with a note of the expense from the time of planting to the commencement of the first thinning, in so far as such information is in the possession of the reporter.

3. On successful planting within the influence of the sea, or on exposed sterile tracts, founded on observation of the habits and appearance of the different sorts of trees considered best suited for such situations—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November in any year.

The plantations reported on must not be less than ten years old.

Information is particularly desired regarding the species and varieties of trees calculated for growing in situations unfavourable to most of those generally cultivated, as bleak heaths, sandy links, unsheltered maritime situations, and high northern exposures.

The reporter must specify the extent of planting and mode of drainage and fencing—the nature of the soil and sub-soil—the elevation and exposure of the locality—its distance from the sea; and, if in his power, he should notice the geological features of the district.

4. On Plantations, of not less than eight years' standing, formed on deep peat bog—The Medium Gold Medal, or Five Sovereigns. To be lodged by 1st November 1874.

The Premium is strictly applicable to deep peat or flow moss; the condition of the moss previous to planting, as well as at the date of the Report, should, if possible, be stated.

The Report must describe the mode and extent of the drainage, and the effect it has had in subsiding the moss—the trenching, levelling, or other preliminary operations that may have been performed on the surface—the mode of planting—kinds, sizes, and number of trees planted per acre—and their relative progress and value, as compared with plantations of a similar age and description grown on other soils in the vicinity.

5. On the more extended introduction of hardy, useful, or ornamental trees, which have not hitherto been generally cultivated in Scotland—The Medium Gold Medal, or Five Sovereigns. To be lodged by 1st November in any year.

The Report should specify as distinctly as possible the kind of trees introduced. The adaptation of the trees for use or ornament, and their comparative progress should be mentioned. Attention is directed to the introduction of any tree as a nurse in young plantations, which by growing rapidly for several years, and attaining maturity when at the height of 20 or 25 feet, might realise the advantages and avoid the evils of thick planting.

6. On the value, for economical purposes, of the Corsican Fir, and on its adaptation to different soils and situations—The Medium Gold Medal, or Five Sovereigns. To be lodged by 1st November in any year.

The reporter's observations must go beyond the limited knowledge of this tree as hitherto grown in Britain, and must embrace its nature, uses, and adaptations in those countries of which it is a native.

7. On the *Cedrus Deodara* and its progress in this country since its introduction, and prospective value as Timber—The Medium Gold Medal, or Five Sovereigns. To be lodged by 1st November 1874.

8. On the *Pinus Pinaster*, or Cluster Pine—The Medium Gold Medal, or Five Sovereigns. To be lodged by 1st November 1874.

The report must state the extent of ground planted in any particular locality, age and size of trees, also the value and duration of its timber as compared with others of the fir tribe.

9. On natural Coppice Wood of other species than Oak, such as Lime, Hazel, Beech, Hornbeam, Birch, and Alder—The Medium Gold Medal, or Five Sovereigns. To be lodged by 1st November 1874.

10. On the effects produced on the various species of Trees and Shrubs by smoke from public works—The Medium Gold Medal, or Five Sovereigns. To be lodged by 1st November 1874.

11. On the more extended cultivation in Scotland of charcoal-producing Plants, for gunpowder or commercial purposes—The Medium Gold Medal, or Five Sovereigns. To be lodged by 1st November 1874.

Reference to be made to suitable varieties of plants not generally grown in this country for that purpose, such as *Rhamnus Frangula*, prices realisable, and suggestions for their more general introduction, treatment, &c.

12. On the woods, forests, and forestry in the county of Perth—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November 1874.

13. On the woods, forests, and forestry in the county of Ross—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November 1874.

14. On the utilization of waste produce of Forests and Woodlands as matter for making, either separately or in combination with other substances, an artificial fuel—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November 1874.

15. On the soils and subsoils suited for the various species of Forest Trees, coniferous and hardwood—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November 1874.

The report must state the kinds best suited for growing on peat and loam, likewise over limestone and granite; also the effects of the various soils and subsoils on timber.

CLASS II.

DISTRICT COMPETITIONS.

The Money Premiums awarded at District Competitions will be paid in January next, by precepts, issued by the Directors. No Payments must, therefore, be made by the Secretary or Treasurer of any local Association.

(*Grants in Aid of* DISTRICT COMPETITIONS *for* 1875 *must be applied for before* 1*st* NOVEMBER *next.*)

SECTION 1.—CATTLE.

Note.—The Society's Cattle Premiums are granted to each District for three alternate years, on condition that the District shall, in the two intermediate years, continue the Competitions by offering for the same description of stock a sum not less than one-half of that given by the Society.

At the intermediate Competitions, a Silver Medal will be placed at the disposal of the Committee, to be awarded to the best Bull belonging to a Proprietor, and of the class for which the District receives Premiums; also three Medium Silver Medals to be given along with the first prize in the three Classes of Cattle, provided there are not fewer than two lots exhibited in each class.

The selection of the Breed is left to the Local Committee. See Rule 6.

DISTRICTS.

1. ISLANDS OF ISLAY, JURA, AND COLONSAY.—*Convener*, Richard D. Campbell of Jura; *Secretary*, William Morison, Callumkill, Port Ellen.
2. DISTRICT OF DEESIDE.—*Convener*, Colonel Innes of Learney, Torphins; *Secretary*, James Shaw, Tillyching, Lumphanan.
3. COUNTY OF RENFREW.—*Convener*, Colonel Campbell of Blythswood; *Secretary*, R. L. Henderson, Paisley.
4. COUNTY OF STIRLING.—*Convener*, Sir Alexander C. R. Gibson Maitland of Clifton Hall, Bart.; *Secretary*, John M. Cunningham, Stirling.
5. COUNTY OF WIGTOWN.—*Convener*, Robert Vans Agnew of Barnbarroch, M.P., Wigtown; *Secretary*, Hugh Adair, Stranraer.
6. COUNTY OF KINCARDINE.—*Convener*, Sir Thomas Gladstone of Fasque, Bart., Laurencekirk; *Secretary*, James B. Greig, Laurencekirk.
7. DISTRICT OF STRATHBOGIE.—*Convener*, Robert Simpson of Cobairdy, Huntly; *Secretary*, William Murdoch, Huntly.
8. DISTRICT OF EAST KILBRIDE.—*Convener*, William Forrest of Lawmuir, Allanton, Hamilton; *Secretary*, William Hay, East Kilbride
9. DISTRICT OF GARIOCH.—*Convener*, William Leslie of Warthill, Pitcaple; *Secretary*, William Home, Westerton of Pitmedden, Insch.

10. Districts of Lorn and Nether Lorn.—*Convener*, James Bett, Easdale, Oban; *Secretary*, Angus Whyte, Easdale, Oban.
11. District of Argyle.—*Convener*, Captain Orde, yr. of Kilmory, Auchnaba, Lochgilphead; *Secretary*, William Hopewell, Raslie Cottage, Kilmartin.
12. Vale of Alford.—*Convener*, R. O. Farquharson of Haughton, Alford; *Secretary*, G. Wilken, Waterside of Forbes, Aberdeenshire.
13. District of Inveraray.—*Secretary and Convener*, John MacArthur, Inveraray.
14. District of Spey, Avon, and Fiddochside.—*Convener*, Sir George Macpherson Grant, of Ballindalloch, Bart.; *Secretary*, William Robertson, Burnside, Ballindalloch.
15. County of Elgin.—*Convener*, C. L. Cumming Bruce of Roseisle; *Joint-Secretaries*, William Macdonald, Elgin, and John Ferguson, East Grange, Forres.
16. Island of Skye.—*Convener*,
Secretary, Alex. Macdonald, Portree.

PREMIUMS.

1. Best Bull, of any pure breed, belonging to a Proprietor, The Silver Medal.
2. Best Bull, of any pure breed, calved before 1st January 1872, Medium Silver Medal and L.4
   Second best, ... L.3
   Third best, ... L.1
3. Best Bull, of any pure breed, calved after 1st January 1872, Medium Silver Medal and L.3
   Second best, ... L.2
   Third best, ... L.1
4. Best 2-year-old Heifer (if Highland breed, 3 years), of any pure breed, Medium Silver Medal and L.3
   Second best, ... L.2
   Third best, ... L.1

In 1874.

Nos. 1 and 2 are in competition for the last year.
Nos. 3, 4, and 5 for the second.
Nos. 6, 7, 8, and 9 for the first year.
Nos. 10, 11, 12, 13, and 14 compete for local Premiums.
Nos. 15 and 16 are in abeyance on account of the Inverness Show.

Section 2.—HORSES

FOR AGRICULTURAL PURPOSES.

Note.—The Society's Stallion Premiums are granted to each district for two years, and are followed by Premiums for other two years for Brood Mares, and again for a similar period by Premiums for Entire Colts and Fillies.

1. Stallions.

1. District of Selkirk and Galashiels.—*Convener*, Allan Eliott Lockhart of Borthwickbrae, Hawick; *Secretary*, James Smail, Commercial Bank, Galashiels.
2. County of Caithness.—*Convener*, Alexander Henderson of Stemster, Halkirk Road, Golspie; *Joint-Secretaries*, James Brims, Writer, Thurso; and James Purves, Lochend, Dunnet.

3 District of Easter Ross.—*Convener*, Kenneth Murray of Geanies, Fearn; *Secretary*, John Douglas, Calrossie, Parkhill.
4. Western District of Fifeshire.—*Convener*, Robert Husband, Gellet, Dunfermline; *Secretary*, James M'Farlane, Dunfermline.
5. District of Strathendrick.—*Convener*, C. H. H. Wilsone of Dalnair, Endrick Bank, Drymen; *Secretary*, James Murray, Catter House, Drymen.

Best Stallion, not under 3 years, and not above 12 years old,	L.25

In 1874.

Nos. 1 and 2 are in competition for the last year.
Nos. 3, 4, and 5 for the first year.

2. Mares.

1. District of Buchan.—*Convener*, Lieutenant-Colonel Ferguson of Pitfour, Mintlaw; *Secretary*, John Ferguson, Brae of Coynach, Mintlaw.
2. County of Kinross.—*Convener*, Harry Young of Cleish, Kinross; *Secretary*, James Beveridge of Balado, Kinross.
3. District of the Black Isle.—*Convener*, James Fletcher of Rosehaugh, Avoch; *Secretary*, George Gillanders, Rosemarkie, Fortrose.

1. Best Brood Mare,	Medium Silver Medal and L 4
2. Second best,	L3
3. Third best,	L1

In 1874.

Nos. 1 and 2 are in competition for the first year.
No. 3 is in abeyance on account of the Inverness Show.

3. Entire Colts and Fillies.

1. County of Haddington.—*Convener*, The Right Hon. R. C. Nisbet Hamilton; *Secretaries*, Richardson & Gemmell, Haddington.
2. County of Inverness.—*Convener*, Æneas W. Mackintosh of Raigmore, Inverness; *Secretary*, Hugh Fraser, Balloch of Culloden, Inverness.
3. Island of Skye.—*Convener*.
Secretary, Alexander Macdonald, Portree.

1. Best Entire Colt, foaled after 1st January 1872,	Medium Silver Medal and L3
Second best,	L2
Third best,	L1
2. Best Entire Colt, foaled after 1st January 1873,	Medium Silver Medal and L2
Second best,	L1
Third best,	10s.
3. Best Filly, foaled after 1st January 1872,	Medium Silver Medal and L3
Second best,	L2
Third best,	L1
4. Best Filly, foaled after 1st January 1873,	Medium Silver Medal and L2
Second best,	L1
Third best,	10s.

In 1874.

No. 1 is in competition for the first year.
No. 2 and 3 are in abeyance on account of the Inverness Show.

SECTION 3.—SHEEP.

Note—The Society's Sheep Premiums are granted to each District for three alternate years, on condition that the District shall, in the two intermediate years, continue the Competitions by offering for the same description of stock a sum not less than one-half of that given by the Society.

At the intermediate Competitions, a Silver Medal will be placed at the disposal of the Committee, to be awarded to the best Tup belonging to a proprietor, and of the class for which the District receives Premiums; also four Medium Silver Medals, to be given along with the first prize in the four classes of Sheep, provided there are not less than two lots in each class.

The selection of the Breed is left to the Local Committee. See Rule 6.

DISTRICTS.

1. ISLAND OF ARRAN.—*Convener*, James Paterson, Lamlash; *Secretary*, Wm. Tod, Glenree, Lamlash.
2. UPPER WARD OF LANARKSHIRE.—*Convener*, John Ord Mackenzie of Dolphinton; *Secretary*, David Oswald, Abington.
3. ISLANDS OF MULL, COLL, AND TYREE.—*Convener*, Farquhar Campbell of Aros; *Secretary*, David Thorburn, Calgary, Tobermory.
4. WEST LOTHIAN AND THE EASTERN DISTRICT OF STIRLINGSHIRE.—*Convener*, Sir William Baillie of Polkemmet, Bart., Whitburn; *Secretary*, George Wilson, Loch House, Linlithgow.
5. COUNTY OF FORFAR.—*Convener*, The Earl of Dalhousie, K.T., Brechin Castle, Brechin; *Secretary*, J. L. Gordon, Swan Street, Brechin.
6. DISTRICT OF WEST TEVIOTDALE.—*Convener*, W. S. Watson of Burnhead, Bucklands, Hawick; *Secretary*, James Oliver of Thornwood, Hawick.
7. DISTRICT OF BREADALBANE.—*Convener*, The Earl of Breadalbane, Taymouth Castle, Aberfeldy; *Secretary*, John Holmes, Kenmore, Aberfeldy.
8. DISTRICT OF COWAL.—*Convener*, Alex. S. Finlay of Castle Toward, Greenock; *Secretary*, Archibald Mitchell, junr., Dunoon.
9. DISTRICT OF ANNANDALE, INCLUDING PARISH OF KIRKMICHAEL.—*Convener*, J. J. Hope Johnstone of Annandale, Raehills, Lockerbie; *Secretary*, Christopher Johnstone, Dinwoodie Lodge, Lockerbie.
10. DISTRICT OF THE BORDER UNION SOCIETY.—*Convener*, John Ord of Muirhouselaw, Nisbet, Kelso; *Secretary*, William Jerdan, Kelso.
11. COUNTY OF SELKIRK.—*Convener*, A. Eliott Lockhart of Borthwickbrae, Hawick; *Secretary*, Peter Rodger, Selkirk.

1.	Best Tup belonging to a Proprietor,	The Silver Medal.
2.	Best Tup above one Shear,	Medium Silver Medal and L.3
	Second best,	L.1
	Third best,	10s.
3.	Best Shearling Tup,	Medium Silver Medal and L.3
	Second best,	L.1
	Third best,	10s.
4.	Best 5 Ewes, above one Shear,	Medium Silver Medal and L.3
	Second best,	L.1
	Third best,	10s.
5.	Best 5 Gimmers or Shearling Ewes,	Medium Silver Medal and L.3
	Second best,	L.1
	Third best,	10s.

In 1874.

No. 1 is in competition for the last year.
Nos. 2, 3, 4, and 5 for the second year.
Nos. 6 and 7 for the first year.
Nos. 8, 9, 10, and 11 compete for local Premiums.

SECTION 4.—SWINE.

The Society's Swine Premiums are given for three consecutive years.

DISTRICT.

COUNTY OF ORKNEY.—*Convener*, David Balfour of Trenaby, Kirkwall; *Secretary*, Marcus Calder, Elwickbank, Kirkwall.

1. Best Boar belonging to a Proprietor,	The Silver Medal.
2. Best Boar,	Medium Silver Medal and L.3
Second best,	L.1
Third best,	10s.
3. Best Brood Sow,	Medium Silver Medal and L.2
Second best,	L.1
Third best,	10s.

In 1874.

Orkney is in competition for the second year.

SECTION 5.—DAIRY PRODUCE.

The Society's Dairy Produce Premiums are given for three consecutive years.

DISTRICT.

COUNTY OF WIGTOWN.—*Convener*, Robert Vans Agnew of Barnbarroch, M.P., Wigtown; *Secretary*, Hugh Adair, Stranraer.

1. Best Couple of Sweet Milk Cheeses belonging to a Proprietor,	The Silver Medal.
2. Best Couple of Sweet Milk Cheeses,	Medium Silver Medal and L.2
Second best,	L.1
Third best,	10s.
3. Best Cured Butter (not less than 14 lbs.) belonging to a Proprietor,	The Silver Medal.
4. Best Cured Butter (not less than 14 lbs.),	Medium Silver Medal and L.2
Second best,	L.1
Third best,	10s.

In 1874.

Wigtownshire is in competition for the last year.

RULES OF COMPETITION.

1. The Members of the Society connected with the respective Districts are appointed Committees for arranging the Competitions; five members to be a quorum.

2. The Convener of each District shall summon a meeting of Committee for the purpose of determining the time and place of Competition, the nomination of Judges, and other preliminary arrangements. The time and place (which must be within the bounds of the District, unless in reference to Stallions special permission has been obtained to the contrary), shall be publicly intimated by Conveners.

3. The Money Premiums awarded at District Competitions will be paid in January next, by precepts issued by the Directors. No payments must, therefore, be made by the Secretary or Treasurer of any local Association.

4. Stock must be the property of the Exhibitor at the date of Entry. *No entry shall be received later than one week previous to the Show.* Entry-Money shall not exceed 2½ per cent. on the amount of the premium to be competed for.

5. The Competitions (except for Horses) must take place between the 1st of April and the 20th of October, and are open to all parties within the District, whether members of the local Association or not.

6. The Committee shall select the breed, and specify it in the returns. In Cattle, the animals exhibited must belong to one of the following pure breeds —Short-horn, Ayrshire, Polled (Galloway, Angus, or Aberdeen), Highland. The Bulls may be of one breed, and the Heifers of another. In Sheep, the breeds must be Leicester, Cheviot, or Blackfaced.

7. Stock of an inferior description, or which does not fall within the prescribed regulations, shall not be placed for competition.

8. The Premiums shall not be divided. In Cattle, Horses, Sheep, and Swine, four lots in each Class will warrant the award of full, and two lots of half, Premiums. In Dairy Produce, eight Exhibitors in any one Class will warrant an award of full, and four of half, Premiums. A competitor may exhibit two lots in each Class, except in Dairy Produce, where only one lot is allowed from the same farm. For the Silver Medal to Proprietors two lots are required.

9. An animal which has gained the Society's first Premium at a previous District or General Show is inadmissible in the same Class, except in the case of Bulls, for the Medal; and one which has gained a second Money Premium can only thereafter compete in that Class for the first.

10. Proprietors farming the whole of their own lands may compete along with Tenant Farmers. Except in the class for Horses, the Money Premiums are restricted to Tenants and Proprietors farming the whole of their own lands.

11. A Tenant or Factor may compete with Proprietors for the Silver Medal with a Bull which has gained the first Money Premium at a previous District or General Show. When there is any doubt as to whether a competitor should be ranked as a Proprietor or a Tenant, the point is left to the decision of the local Committee.

12. A Bull, the property of two or more Tenants, may compete, although the Exhibitors may not be Joint-Tenants.

13. Bulls for which Money Premiums are awarded may be required to serve in the District at least one season; the rate of service to be fixed by the Committee.

14. Evidence must be produced that the Prize Stallions have had produce.

15. Mares must have foals at their feet (except where death of foal is certified), or be entered as being in foal; in the latter case, payment of the Premiums will be deferred till certificate of birth.

16. Aged Tups shall have served the usual number of Ewes for at least three weeks during the previous season. All Prize Tups must serve within the district. Ewes and Gimmers must be taken from the Exhibitor's stock bred in the district; and Ewes must have reared Lambs during the season. Fleeces must not be artificially coloured.

17. Should it be proved to the satisfaction of the Committee that an animal has been entered under a false name, pedigree, or description, for the purpose of misleading the Committee or Judges as to its qualifications or properties, the case shall be reported to the Directors, and submitted by them to the first General Meeting, in order that the Exhibitor shall be disqualified from again competing at the Society's Shows, and his name, if he be a member, struck from the roll.

18. When an animal has previously been disqualified by the decision of any Agricultural Association in Great Britain or Ireland, such disqualification shall attach, if the Exhibitor, being aware of the disqualification, fail to state

it, and the grounds thereof, in his entry, to enable the Committee to judge of its validity.

19. Competitors must certify that the Butter and Cheese exhibited by them are average specimens of the produce of their Dairies in 1874, and that the quantity produced during the season has not been less than 1 cwt. of Butter, or 2 cwt. of Cheese.

20. It is to be distinctly understood that in no instance does any claim lie against the Society for expenses attending a show of stock beyond the amount of the Premiums offered.

21. Blank reports will be furnished to the Conveners and Secretaries of the different districts. These must, in all details, be completed and lodged with the Secretary *on or before the 1st of November next*, for the approval of the Directors, against whose decisions there shall be no appeal.

22. A report of the Competition and Premiums awarded at the *intermediate* local shows in the several districts for Cattle and Sheep, signed by a member of the Society, must be transmitted to the Secretary *on or before the 1st of November in each year*, otherwise the Society's grants shall terminate.

SECTION 6.—SPECIAL GRANTS.

L.50 and Medium Gold Medal to the Edinburgh Christmas Club for 1874.

L.20 to the Ayrshire Agricultural Association for 1874, to be competed for at the Dairy Produce Show at Kilmarnock—*Convener*, The Hon. G. R. Vernon, Auchans House, Kilmarnock; *Secretary*, James M'Mutrie, Ayr.

L.20 to the Unst Society for three alternate years—*Convener*, Thomas Edmondston of Buness, Lerwick; *Secretary*, D. J. White, Unst, Lerwick. Granted 1871.

L.5 to the Shetland Society for three alternate years—*Convener*, John Bruce of Sumburgh, Lerwick; *Joint-Secretaries*, John Walker, Maryfield, Bressay, and David Shepherd, Symbister. Granted 1873.

SECTION 7.—MEDALS IN AID OF PREMIUMS GIVEN BY LOCAL SOCIETIES.

The Society, being anxious to co-operate with local Associations, will give a limited number of Medium Silver Medals annually to Societies not on the list of Cattle or Sheep Premiums, in addition to the Money Premiums awarded in the District, for—

1. Best Bull, Cow, Heifer, or Ox.
2. Best Stallion, Mare, or Gelding.
3. Best Tup, or pen of Ewes or Wethers.
4. Best Boar, Sow, or Pig.
5. Best Coops of Poultry.
6. Best sample of any variety of Wool.
7. Best sample of any variety of Seeds.
8. Best managed Farm.
9. Best managed Green Crop.
10. Best managed Hay Crop.
11. Best managed Dairy.
12. Best Sweet Milk Cheese.
13. Best Cured Butter.
14. Best Collection of Roots.
15. Best kept Fences.

16. Male Farm-Servant who has been longest in the same service, and who has proved himself most efficient in his duties, and to have invariably treated the animals under his charge with kindness.
17. Female Servant in charge of Dairy and Poultry who has been longest in the same service, and who has proved herself most efficient in her duties, and to have invariably treated the animals under her charge with kindness.
18. Best Sheep Shearer.
19. Most expert Hedge Cutter.
20. Most expert Labourer at Draining.
21. Most expert Farm Servant at trial of Reaping Machines.
22. Best Maker of Oat Cakes.

It is left to the local Society to choose out of the foregoing list the classes for which the medals are to be competed.

The Medals are given for Five consecutive years.

Aberdeenshire.

1. AUCHINDOIR, KILDRUMMY, and TOWIE ASSOCIATION.—*Convener*, Carlos Pedro Gordon of Wardhouse, Insch; *Secretary*, William Walker, Ardhuncart, Mossat. 4 Medals. Granted 1873.
2. BUCHAN SOCIETY.—*Convener*, Lieut.-Col. Ferguson of Pitfour, Mintlaw; *Secretary*, John Ferguson, Brae of Coynach, Mintlaw. 2 Medals. Granted 1870.
3. BUCHAN POULTRY ASSOCIATION.—*Convener*, Lieut.-Col. Ferguson of Pitfour, Mintlaw; *Secretary*, Robert Scott, Yokieshill, Mintlaw. 2 Medals. Granted 1870.
4. CLUNY ASSOCIATION.—*Convener*, John Gordon of Cluny, Aberdeen; *Secretary*, John F. Fyffe, F. C. Schoolhouse, Cluny. 4 Medals. Granted 1870.
5. COLDSTONE AND MIGVIE.—*Convener and Secretary*, Dr Robertson, Indego, Tarland. 1 Medal. Granted 1870
6. CROMAR, UPPER DEE AND DONSIDE ASSOCIATION.—*Convener*, Dr Robertson, Indego, Tarland; *Secretary*, John Charles, Tarland. 4 Medals. Granted 1872 and 1873.
7. DONSIDE CLUB.—*Convener*, Sir William Forbes of Craigievar, Bart., Fintray House, Aberdeen; *Secretary*, William Wishart, Cairntradlyn, Blackburn. 1 Medal. Granted 1870.
8. EBRIESIDE ASSOCIATION.—*Convener*, John Leith Ross of Arnage, Ellon; *Secretary*, George Johnston, Overtown, Auchnagatt. 4 Medals. Granted 1871 and 1874.
9. FORMARTINE ASSOCIATION.—*Convener*, Lieut.-Col. Ramsay of Barra, Straloch, Aberdeen; *Secretary*, Alexander Davidson, Mains of Cairnbrogie, Tarves. 2 Medals. Granted 1871.
10. FYVIE ASSOCIATION.—*Convener*, Col. Gordon of Fyvie; *Secretary*, Wm. Ironside, Burnside of Petty, Fyvie. 2 Medals. Granted 1872.
11. GARIOCH TURNIP SOCIETY.—*Convener*, James Gordon of Manar, Inverurie; *Secretary*, James Stephen, Conglass, Inverurie. 2 Medals. Granted 1870.
12. INSCH HORTICULTURAL SOCIETY.—*Convener*, Col. Leith Hay of Rannes, C.B.; *Secretary*, John Gartly, Insch. 2 Medals. Granted 1874.
13. KEIG POULTRY AND DAIRY PRODUCE ASSOCIATION.—*Convener*, Lord Forbes, Castle Forbes, Keig, Aberdeen; *Secretary*, George Bruce, Keig, Whitehouse, Aberdeen. 2 Medals. Granted 1872.

14. Kincardine O'Neil and Upper Deeside Association.—*Convener*, Col. Innes of Learney, Torphins; *Secretary*, Alexander Niven, Craigmyle Mills, Torphins. 7 Medals. Granted 1871 and 1873.

15. Kinnethmont Society.—*Convener*, Col. Leith Hay of Rannes, C.B., Leith Hall, Kinnethmont; *Secretary*, William Gerrard, Schoolhouse, Kinnethmont. 5 Medals. Granted 1870 and 1874.

16. Leochel-Cushnie Society.—*Convener*, Sir William Forbes of Craigievar, Bart.; *Secretary*, Hary Shaw, Bogfern, Tarland. 3 Medals. Granted 1870.

17. Mar Association.—*Convener and Secretary*, Silvester Campbell, Kinnellar, Blackburn, Aberdeen. 4 Medals. Granted 1874.

18. North-East Aberdeenshire Society.—*Convener*, Alex. Lovie, Nether Boyndlie, Fraserburgh; *Secretary*, John Bell, Merryhillock, Fraserburgh. 6 Medals. Granted 1873.

19. North of Scotland Root, Vegetable, and Fruit Association.—*Convener*, Lieut.-Col. Ramsay of Straloch, Aberdeen; *Secretary*, James Smith, Inverurie. 2 Medals. Granted 1874.

20. Strathbogie Club.—*Convener*, Robert Simpson of Cobairdy, Huntly; *Secretary*, William Murdoch, Huntly. 2 Medals. Granted 1870.

21. Strichen Society.—*Convener*, Alex. Whitelaw, M.P.; *Secretary*, John Sleigh, Strichen. 1 Medal. Granted 1873.

22. Turriff Association.—*Convener*, Alexander Stuart of Laithers, Turriff; *Secretary*, William Ingram, Sunnyhill, Turriff. 6 Medals. Granted 1870.

23. Warthill Turnip Club.—*Convener*, William Leslie of Warthill, Pitcaple; *Secretary*, Adam Singer, Rothmaise, Insch. 2 Medals. Granted 1873.

Argyllshire.

24. Kilfinan Society.—*Convener*, Campbell Macpherson Campbell of Ballimore; *Secretary*, W. Anderson, Ballimore, Tighnabruaich. 3 Medals. Granted 1870.

25. Kintyre Society.—*Convener*, John Lorn Stewart of Coll, Campbeltown; *Secretary*, Thomas Brown, Campbeltown. 4 Medals. Granted 1873.

26. Strontian Society.—*Convener*, Sir Thomas Miles Riddell, Bart., Strontian; *Secretary*, Alexander Kinnear, Strontian, Fort-William. 2 Medals. Granted 1871.

Ayrshire.

27. Ardrossan Society.—*Convener*, David Cuninghame, Chapelton, Ardrossan; *Secretary*, James Campbell, Saltcoats. 4 Medals. Granted 1870.

28. Carrick Society.—*Convener*, James Baird of Cambusdoon, Ayr; *Secretary*, David Brown, Maybole. 6 Medals. Granted 1870 and 1872.

29. Cumnock Society.—*Convener*, John Hyslop of Bank, New Cumnock; *Secretary*, James Murray, jun., Dumfries Arms, Cumnock. 6 Medals. Granted 1870.

30. Dalry Society.—*Convener*, Andrew Allan, Munnoch, Dalry; *Secretary*, Robert Craig, Flashwood, Dalry. 2 Medals. Granted 1872.

31. Dundonald Club.—*Convener*, the Hon. G. R. Vernon, Auchans House, Kilmarnock; *Secretary*, John Caldwell, Ploughland, Dundonald. 2 Medals. Granted 1871.

32. Galston Society.—*Convener*, Alexander D. Tait of Milrig, Galston; *Secretary*, Robert Hendrie, Drumdroch, Galston. 2 Medals. Granted 1870.

33. Kilmarnock Club.—*Convener*, Frederick J. Turner, The Dean, Kilmarnock; *Secretaries*, James and W. H. Wilson, Kilmarnock. 5 Medals. Granted 1870 and 1872.

34. Kirkmichael Society.—*Convener*, John Rankine of Beoch, Lochlands, Maybole; *Secretary*, Wm. Anderson, Barneil, Kirkmichael, Maybole. 4 Medals. Granted 1874.

35. Loudoun Society.—*Convener*, Robert Mackie, Loudoun Cottage, Galston; *Secretary*, Hugh Morton, auctioneer, Newmilns. 2 Medals. Granted 1872.

36. Mauchline Society.—*Convener*, C. V. Hamilton Campbell of Nether Place, Cairnhill, Kilmarnock; *Secretary*, John L. Thomson, Parish School, Mauchline. 5 Medals. Granted 1870.

37. Muirkirk Association.—*Convener*, James Baird of Cambusdoon, Ayr; *Secretary*, A. Donald, The Schoolhouse, Muirkirk. 6 Medals. Granted 1873.

38. New Cumnock Society.—*Convener*, John Hyslop of Bank, New Cumnock; *Secretary*, John Picken, Mansfield Mains, New Cumnock. 4 Medals. Granted 1874.

39. Sorn Society.—*Convener*, Graham Somervell of Sorn, Mauchline; *Secretary*, Thomas Traill, Sorn Mains, Mauchline. 5 Medals. Granted 1870.

40. Stewarton Society.—*Convener and Secretary*, John Lindsay, Thornhill, Stewarton. 4 Medals. Granted 1870.

41. Tarbolton Society.—*Convener*, William Cooper of Failford, Smithstone House, Tarbolton; *Secretary*, Edward Dodd, Tarbolton. 1 Medal. Granted 1870.

42 West Kilbride Society.—*Convener*, John Crawford, Milstonford, West Kilbride; *Secretary*, George Harvey, Gill, West Kilbride. 5 Medals. Granted 1870.

Banffshire.

43. Central Banffshire Club.—*Convener*, William Longmore, Keith; *Secretary*, James Geddes Brown, Keith. 6 Medals. Granted 1872 and 1873.

44. United Banffshire Society.—*Convener*, *Secretary*, George Cumming, Banff. 6 Medals. Granted 1870.

Bute and Arran.

45. Bute Society.—*Convener*, Henry Stuart, Rothesay; *Secretary*, John T. Wilson, Rothesay. 3 Medals. Granted 1870.

Caithness-shire.

46. Caithness Society.—*Convener*, Alexander Henderson of Stemster, Halkirkroad, Golspie; *Joint-Secretaries*, James Brims, writer, Thurso, and James Purves, Lochend, Thurso. 6 Medals. Granted 1870.

Clackmannanshire.

47. Clackmannanshire Society.—*Convener*, James Johnstone of Alva, Stirling; *Secretary*, John Bleloch, Hazleyshaw, Alloa. 4 Medals. Granted 1870.

Dumbartonshire.

48. DUMBARTONSHIRE SOCIETY.—*Convener*, Alex. Smollett of Bonhill, Cameron House, Alexandria, N.B.; *Secretary*, Wm. H. Murray, Strathleven, Dumbarton. 4 Medals. Granted 1873 and 1874.

49. WESTERN DISTRICT OF DUMBARTONSHIRE.—*Convener*, Sir James Colquhoun of Luss, Bart., Rossdhu, Luss; *Secretary*, Andrew Wyllie, Camstraddan, Luss. 2 Medals. Granted 1871.

Dumfriesshire.

50. ANNANDALE FARMERS' CLUB.—*Convener*, J. J. Hope Johnstone of Annandale; *Secretary*, John Baird, jun., Lockerbie. 4 Medals. Granted 1874.

51. NITHSDALE SOCIETY.—*Convener*, J. Gilchrist Clark of Speddoch Dabton, Thornhill; *Secretary*, Dr Russell, Thornhill. 2 Medals. Granted 1870.

52. SANQUHAR SOCIETY.—*Convener*, John Gilchrist Clark of Speddoch Dabton. Thornhill; *Secretary*, W. O. Macqueen, Sanquhar. 6 Medals. Granted 1870.

Edinburghshire.

53. DALKEITH SOCIETY.—*Convener*, Sir James Gardiner Baird, Bart., Inch House, Liberton; *Secretary*, James Wilson, Wester Cowden, Dalkeith. 10 Medals. Granted 1870 and 1872.

54. PENICUIK SOCIETY.—*Convener*, Charles Cowan of Loganhouse, Penicuik; *Secretary*, James Alexander, Penicuik. 2 Medals. Granted 1870.

55. WESTERN DISTRICT OF MID-LOTHIAN ASSOCIATION.—*Conveners*, Peter M'Lagan of Pumpherston, M P., Midcalder, and Captain Tod of Howden, Midcalder; *Secretary*, James Hislop, Midcalder. 2 Medals. Granted 1870.

Elginshire.

56. FORRES AND NORTHERN CLUB.—*Convener*, Robert Grant of Kincorth, Forres; *Secretary*, R. H. Harris, Earnhill, Forres. 6 Medals. Granted 1870.

57. MORAYSHIRE FARMERS' CLUB.—*Convener*, C. L. Cumming Bruce of Roseisle, Dunphail, Edinkillie; *Joint-Secretaries*, William Macdonald, Elgin, and John Ferguson, East Grange, Forres. 6 Medals. Granted 1870.

58. SPEY, AVON, AND FIDDOCHSIDE SOCIETY.—*Convener*, Sir George Macpherson Grant, Bart.; *Secretary*, William M. Skinner, Drumin, Ballindalloch. 4 Medals. Granted 1870.

Fifeshire.

59. AUCHTERMUCHTY SOCIETY.—*Convener*, J. Bogie, Balcanquhal, Auchtermuchty; *Secretary*, H. W. Walker, Auchtermuchty. 5 Medals. Granted 1874.

60. KINGLASSIE SOCIETY.—*Convener*, R. Sinclair Aytoun of Inchdairnie, Kirkcaldy; *Secretary*, David Beath, Auchmuir, Leslie. 2 Medals. Granted 1870.

Inverness-shire.

61. BADENOCH AND ROTHIEMURCHUS SOCIETY.—*Convener*, Cluny Macpherson, Cluny Castle, Kingussie; *Secretary*, Donald Stewart, Biallid, Kingussie. 2 Medals. Granted 1873.

62. GLEN URQUHART SOCIETY.—*Convener*, The Earl of Seafield; *Secretary*, Capt. Grant, Drumbuie, Glen Urquhart. 3 Medals. Granted 1870.

63. INVERNESS SOCIETY.—*Convener*, Arthur Forbes of Culloden, Inverness; *Secretary*, Hugh Fraser, Balloch of Culloden, Inverness. 7 Medals. Granted 1870.

64. NORTHERN COUNTIES FAT SHOW CLUB.—*Convener*, The Hon. The Master of Lovat; *Secretary*, John Cran, Kirkton, Inverness. 6 Medals. Granted 1870.

65. STRATHSPEY SOCIETY.—*Convener*, The Earl of Seafield; *Secretary*, Francis Macbean, factor's office, Grantown. 8 Medals. Granted 1870 and 1872.

Kincardineshire.

66. FETTERCAIRN CLUB.—*Convener*, Lieut.-Col. M'Inroy of The Burn, Brechin; *Secretary*, John Smith, Balmain, Fettercairn. 3 Medals. Granted 1870.

67. KINCARDINESHIRE CLUB.—*Convener*, Sir Thomas Gladstone of Fasque, Bart., Laurencekirk; *Secretary*, James B. Greig, Laurencekirk. 1 Medal. Granted 1870.

Kinross-shire.

68. KINROSS-SHIRE SOCIETY.—*Convener*, Harry Young of Cleish, Kinross; *Secretary*, James Beveridge of Balado, Kinross. 2 Medals. Granted 1870.

Lanarkshire.

69. AVONDALE SOCIETY.—*Convener*, John Stewart, Burnside, Strathaven; *Secretary*, William Lambie of Hallburn, Strathaven. 2 Medals. Granted 1870.

70. BOTHWELL SOCIETY.—*Convener*, W. W. Hozier of Tannochside, Bellshill; *Secretary*, Robert Bruce, teacher, Uddingston. 2 Medals. Granted 1870.

71. CADDER SOCIETY.—*Convener*, Alexander Campbell, Crosshill, Bishopbriggs; *Secretary*, John Marshall, jun., 168 St Vincent Street, Glasgow. 2 Medals. Granted 1870.

72. CALDER WATER SOCIETY.—*Convener*, Peter Forest of Heirmyres, City of Glasgow Bank, Shotts; *Secretary*, James Ferguson, Ferniesbaw, Holytoun. 2 Medals. Granted 1873.

73. CARMUNNOCK SOCIETY.—*Convener*, Professor M'Call, Glasgow; *Secretary*, William Fleming, Muirside, Carmunnock. 2 Medals. Granted 1870.

74. LANARKSHIRE SOCIETY.—*Convener*, D. C. R. Carrick Buchanan of Drumpellier, Coatbridge; *Secretary*, William Munro, Hamilton. 2 Medals. Granted 1870.

75. UPPER WARD OF LANARKSHIRE ASSOCIATION.—*Convener and Secretary*, Andrew Smith, Castle Mains, Douglas. 2 Medals. Granted 1874.

Linlithgowshire.

76. BATHGATE ASSOCIATION.—*Convener*, Andrew Gillon of Wallhouse, Bathgate; *Joint-Secretary*, G. M. Johnston, Bathgate. 2 Medals. Granted 1873.

77. WHITBURN SOCIETY.—*Convener*, Robert Gardner, Whitburn; *Secretary*, A. B. Brown, Whitburn. 2 Medals. Granted 1870.

Nairnshire.

78. Nairnshire Society.—*Convener*, W. A. Stables, Cawdor Castle, Nairn; *Secretary*, John Ross, Budgate, Nairn. 8 Medals. Granted 1870 and 1871.

Orkney and Shetland.

79. Shetland Society.—*Convener*, John Bruce of Sumburgh, Lerwick; *Joint-Secretaries*, John Walker, Maryfield, Bressay, Lerwick, and David Shepherd, Symbister, Lerwick. 7 Medals. Granted 1870.

Peeblesshire.

80. Broughton Society.—*Convener*, James Tweedie of Quarter, Rachan House, Biggar; *Secretary*, James Wilson, jun., Burnetland, Biggar. 1 Medal. Granted 1870.

81. West Linton Society.—*Convener*, W. A. Woddrop of Dalmarnock, Garvald House, Dolphinton; *Secretary*, Archibald Alexander, West Linton, Penicuik. 2 Medals. Granted 1870.

Perthshire.

82. Culross Society.—*Convener*, J. J. Dalgleish of West Grange; *Secretary*. Christopher Forrester, Balgownie Mains, Culross. 3 Medals. Granted 1870.

83. Dunblane Club.—*Convener*, John Stirling of Kippendavie, Dunblane; *Secretary*, Andrew Kinross, Whitestown, Dunblane. 1 Medal. Granted 1870.

84. Dunning Society.—*Convener*, James Morison, Rossie, Dunning; *Secretary*, Wm. Bruce, merchant, Dunning. 1 Medal. Granted 1873.

85. Middle District of Athole and Tullymet.—*Convener*, William Dick of Tullymet, Ballinluig; *Secretary*, Duncan Macdonald, Ballinluig. 1 Medal. Granted 1870.

86. Moulin Association.—*Convener*, H. B. Stewart of Balnakilly, Pitlochrie; *Secretary*, D. M'Gillewie, Pitlochrie. 1 Medal. Granted 1873.

87. Scottish Midland Association.—*Convener*, Sir Wm. Stirling Maxwell of Keir, Bart., M.P., Dunblane; *Secretary*, Melville Jameson, Perth. 4 Medals. Granted 1872.

88. Strathearn Central Society.—*Convener*, Colonel Hunter of Auchterarder; *Secretary*, Robert Gardiner, Chapel Bank, Auchterarder. 3 Medals. Granted 1870 and 1872.

89. Upper Strathearn Society.—*Convener*, D. R. Williamson of Lawers, Crieff; *Secretary*, James M'Laren, Crieff. 3 Medals. Granted 1873.

Renfrewshire.

90. Lower Ward of Renfrewshire Society.—*Convener*, Sir Michael R. Shaw Stewart of Ardgowan, Bart., Greenock; *Secretary*, D. L. Macadam, Mansion House, Greenock. 4 Medals. Granted 1873.

Ross-shire.

91. Black Isle Society.—*Convener*, James Fletcher of Rosehaugh, Avoch; *Secretary*, George Gillanders, Rosemarkie, Fortrose. 2 Medals. Granted 1870.

92. EASTER ROSS SOCIETY.—*Convener*, Kenneth Murray of Geanies, Fearn; *Secretary*, John Douglas, Calrossie, Parkhill. 6 Medals. Granted 1870.

93. WESTER ROSS CLUB.—*Convener*, K. W. Stewart Mackenzie of Seaforth, Dingwall; *Secretary*, David Ross, Dingwall. 6 Medals. Granted 1870.

Stirlingshire.

94. EASTERN DISTRICT OF STIRLINGSHIRE—*Convener*, Ralph Stark, Camelon, Falkirk; *Secretary*, Thomas Binnie, auctioneer, Falkirk. 2 Medals. Granted 1870.

95. GARGUNNOCK SOCIETY.—*Convener*, Sir Henry J. Seton Steuart of Allanton, Bart., Stirling; *Secretary*, Thomas Leishman, Meiklewood, Gargunnock. 2 Medals. Granted 1870.

96. STIRLINGSHIRE SOCIETY.—*Convener*, John Stirling of Kippendavie, Dunblane; *Secretary*, John M. Cunningham, Stirling. 5 Medals. Granted 1870.

Sutherlandshire.

97. NORTH AND WEST OF SUTHERLAND FARMERS' CLUB.—*Convener and Secretary*, William Mitchell, Ribigill, Tongue, Lairg. 2 Medals. Granted 1872.

Wigtownshire.

98. KIRKMAIDEN SOCIETY.—*Convener and Secretary*, Gilbert R. Murray, Chapelrossan, Stranraer. 5 Medals. Granted 1870 and 1871.

The Medals are given for Five consecutive years.

Applications from other Districts must be lodged with the Secretary of the Society *by 1st November next.*

RULES OF COMPETITION.

1. All Competitions must be at the instance of a local Society.

2. The classes for which Medals are granted must be in accordance with the list at pages 39 and 40.

3. In each district the Convener (who must be a Member of the Society) shall fix the time and place of Competition, appoint the Judges, and make all other necessary arrangements, in concurrence with the other Members of the Society, and the local Association of the District.

4. The Money Premiums given in the District must be L.2 for each Medal claimed.

5. The Committee shall select the breed, and specify it in the return.

6. The quantity of seed shown in Competition by each Grower must not be less than one quarter of each variety of Grain, or four bushels of Beans or Grass Seeds. The first Premium awarded by the District shall not be less than L.1 for each kind of Grain for which a Medal is claimed. The Judges shall be guided in their awards—1st, By the purity of the Seed; 2d, By its freeness from extraneous Seeds; and 3d, Where there is an equality in these respects, by the weight. The varieties for which premiums have been given must be named.

7. The Medal for Sheep Shearing shall not be awarded unless there are three competitors, and it shall always accompany the highest money premium. There must not be fewer than two competitors in all the other classes.

8. Blank reports will be furnished to all the Conveners of the different Districts. These must, in all details, be completed and lodged with the Secretary *on or before the 1st of November next*, with the exception of

green crop reports, which must be sent on or before the 20th of December, for the approval of the Directors, against whose decisions there shall be no appeal.

SECTION 8.—PLOUGHING COMPETITIONS.

The Minor Silver Medal will be given to the winner of the first or highest Premium at Ploughing Competitions, provided a Report in the following terms is made to the Secretary, within one month of the Competition, by a Member of the Society:—

FORM OF REPORT.

I, of Member of the Highland and Agricultural Society, hereby certify that I attended the Ploughing Match of the Association at in the county of on the when ploughs competed; of land was assigned to each, and hours were allowed for the execution of the work. The sum of L. was awarded in the following proportions, viz.:—

[Here enumerate the names and designations of successful Competitors.]

RULES OF COMPETITION.

1. All matches must be at the instance of a local Society or Ploughing Association, and no Match at the instance of an individual, or confined to the tenants on one estate, will be recognised.
2. The title of such Society or Association, together with the name and address of the Secretary, must be registered with the Secretary of the Highland and Agricultural Society, 3 George IV. Bridge, Edinburgh.
3. Not more than one Match in the same season can take place within the bounds of the same Society or Association.
4. All reports must be lodged within one month of the date of the Match, and certified by a Member of the Society who was present at it.
5. A Member can only report one Match, and a Ploughman can only carry one Medal in the same season.
6. To warrant the Medal, there must have been twelve ploughs in Competition, and Three Pounds awarded in Premiums. The Medal to be given to the winner of the first or highest prize.
7. Ploughmen shall not be allowed any assistance, and their work must not be set up nor touched by others: on land of average tenacity the ploughing should be at the rate of an imperial acre in ten hours, and attention should be given to the firmness and sufficiency of the work below, more than to its neatness above the surface.

SECTION 9.—COTTAGES AND GARDENS.

The following Premiums are offered for Competition in the Parishes after-mentioned.

The Premiums for Cottages and Gardens are given for five consecutive years.

1. PREMIUMS FOR BEST KEPT COTTAGES AND GARDENS.

1. Best kept Cottage in each Parish—One Pound; and where there are four Competitors—Minor Silver Medal.

Second best—Ten Shillings.

Third best—Minor Silver Medal.

2. Best kept Cottage Garden in each Parish—One Pound; and where there are four Competitors—Minor Silver Medal.
Second best—Ten Shillings.
Third best—Minor Silver Medal.

Aberdeenshire.

1. ABOYNE AGRICULTURAL SOCIETY.—*Convener*, The Marquis of Huntly; *Secretary*, M. T. Bell, Aboyne. Granted 1870.
2. BIRSE.—*Convener*, W. E. Nicol of Ballogie, Aberdeen; *Secretary*, George Wyllie, Ballogie, Aberdeen. Granted 1870.
3. CRATHIE AND BRAEMAR.—*Convener and Secretary*, Dr Robertson, Indego, Tarland. Granted 1872.
4. KINCARDINE O'NEIL HORTICULTURAL SOCIETY.—*Convener*, Colonel Innes of Learney, Torphins; *Secretary*, Alex. Cooper, Mill of Kincardine, Kincardine O'Neil. Granted 1870.
5. LEOCHEL-CUSHNIE.—*Convener*, Sir Wm. Forbes of Craigievar, Bart.; *Secretary*, Hary Shaw, Bogfern, Tarland. Granted 1870.
6. STRICHEN.—*Convener and Secretary*, John Sleigh, Strichen. Granted 1870.
7. TARLAND-CROMAR.—*Convener*, Dr Robertson, Indego, Tarland. Granted 1870.

Berwickshire.

8. SINCLAIRSHILL HORTICULTURAL SOCIETY.—*Convener*, Archibald Campbell Swinton of Kimmerghame, Dunse; *Secretary*, David Jack, The Gardens, Kimmerghame, Dunse. Granted 1873.

Edinburghshire.

9. BALERNO AND CURRIE.—*Convener*, A. J. Russell, C.S., Edinburgh; *Secretaries*, David Bisset, Balerno, Currie, and Alex. Maltman, Rosebank Cottage, Currie. Granted 1870.
10. CRAMOND.—*Convener*, Henry Davidson of Muirhouse, Davidson's Mains, Edinburgh; *Secretary*, Granted 1871.

Fifeshire.

11. NEWBURGH GARDENING SOCIETY.—*Convener*, John Lyell, Newburgh; *Secretary*, Robert Clark, Newburgh. Granted 1874.

Lanarkshire.

12. MUIRKIRK.—*Convener*, John Allan, Bankend House, Cumnock; *Secretary*, Alexander Donald, Muirkirk. Granted 1870.

Linlithgowshire.

13. DALMENY AND QUEENSFERRY HORTICULTURAL SOCIETY.—*Convener*, Peter Glendinning, Dalmeny Park, Edinburgh; *Secretary*, John Allan, Dalmeny Park. Granted 1872.
14. KIRKLISTON HORTICULTURAL ASSOCIATION.—*Convener*, Peter Glendinning, Dalmeny Park; *Secretary*, A. W. Mack, Schoolhouse, Winchburgh. Granted 1874.

Peeblesshire.

15 BROUGHTON.—*Convener*, James Tweedie of Quarter; *Secretary*, James Wilson, jun., Burnetland, Biggar. Granted 1870.

Perthshire.

16. ABERNETHY.—*Convener*, John Bosomworth, Abernethy. Granted 1870.
17. AUCHTERARDER.—*Convener*, Colonel Hunter of Auchterarder; *Secretary*, William Hutton, Auchterarder. Granted 1870.
18. DUNBARNEY, including that portion of Craigend in the parish of Perth.—*Convener*, Sir Thomas Moncreiffe of Moncreiffe, Bart., Bridge of Earn; *Secretary*, Henry Methven, Dunbarney House, Bridge of Earn. Granted 1874.
19. DUNNING.—*Convener*, James Morison, Rossie, Dunning; *Secretary*, Wm. Bruce, merchant, Dunning. Granted 1870.
20. FORGANDENNY.—*Convener*, Henry Drysdale, Mains of Aberdalgie, Perth; *Secretary*, A. M. Nicholson, Eastfield, Forgandenny. Granted 1870.
21. GASK.—*Convener*, Colonel Macdonald Macdonald of St Martins; *Secretary*, Thomas Ross, Bachilton, Perth. Granted 1870.

Wigtownshire.

22. KIRKCOLM.—*Convener*, David Guthrie, Stranraer. Granted 1870.
23. LESWALT.—*Convener*, Sir Andrew Agnew of Lochnaw, Bart. Granted 1870.
24. STONEYKIRK.—*Convener*, David Frederick, Dumbreddon, Stranraer, Granted 1870.

RULES OF COMPETITION.

1. Competitions may take place in the different parishes for Cottages and Gardens, or for either separately.

2. The occupiers of Gentlemen's Lodges and Gardeners' Houses, as well as Gentlemen's Servants occupying Cottages in the Policies, or on land in the natural possession of their masters, are excluded, as well as others whom the Committee consider, from their position, not to be entitled to compete. The inspection must be completed by the 1st of October. In making the inspection, the Conveners may take the assistance of any competent judges.

3. It is left to the Committee of the district to regulate the maximum annual rent of the Cottages, which may, with the garden, be from L.5 to L.7.

4. A person who has gained the highest premium cannot compete again, but will be entitled to a Medal if certified by the Committee to be equal in merit to the first on the list of Competitors.

5. If the Cottage is occupied by the proprietor, the roof must be in good repair; if the roof is of thatch, it must be in good repair, though in the occupation of a tenant. The interior and external conveniencies must be clean and orderly—the windows must be free of broken glass, clean, and affording the means of ventilation. Dunghills, and all other nuisances, must be removed from the front and gables. In awarding the Cottage Premiums, preference will be given to Competitors who, in addition to the above requisites, have displayed the greatest taste in ornamenting the exterior of their houses, and the ground in front and at the gables.

6. In estimating the claims for the Garden Premiums, the judges should have in view:—The sufficiency and neatness of the fences and walks; the cleanness of the ground; the quality and choice of the crops; and the general productiveness of the garden.

7. Reports, stating the number of Competitors, the names of successful parties, and the nature of the exertions which have been made by them, must be transmitted by the Conveners to the Secretary *on or before the* 1*st November next.*

Parishes desirous of these Premiums must lodge applications with the Secretary *on or before the* 1*st November next.*

2. MEDALS FOR COTTAGES AND GARDENS OR GARDEN PRODUCE.

The Society will issue annually two Medium Silver Medals to a limited number of local Associations or individuals, who at their own expense establish premiums for Cottages or Gardens under L.15 of Rent. The Medals may be awarded for best kept Cottage, and best kept Garden or Flower Plot, or Garden Produce.

Local Associations or individuals desirous of these Medals, must lodge Applications with the Secretary *on or before the* 1*st of November next.* The Medals are given for five consecutive years.

Aberdeenshire.

1. CLUNY.—*Convener*, John Gordon of Cluny, Aberdeen; *Secretary*, James Barron, Blackstock, Cluny. Granted 1871.
2. CRAIGIEVAR.—*Convener*, Sir William Forbes, Bart. Granted 1870.
3. CRIMONMOGATE.—*Convener*, Sir Alexander Bannerman, Bart.; *Secretary*, James Thomson, Crimonmogate, Loanway. Granted 1870.
4. FINTRAY.—*Convener*, Sir William Forbes, Bart.; *Secretary*, William Warrack, Newmill of Fintry, Aberdeen. Granted 1870.
5. KEIG CLUB.—*Convener*, Lord Forbes; *Secretary*, George Bruce, Keig. Granted 1873.
6. KINELLAR.—*Convener*, C. E. Dalrymple of Kinellar Lodge, Blackburn; *Secretary*, Alex. Taylor, Fichnie, Kinellar. Granted 1870.
7. O'NEIL CORSE.—*Convener*, J. O. Forbes of Corse. Granted 1870.

Ayrshire.

8. MAUCHLINE.—*Convener*, C. V. Hamilton Campbell of Nether Place; *Secretary*, John L. Thomson, Mauchline. Granted 1870.

Banffshire.

9. BALLINDALLOCH. — *Convener*, Sir George Macpherson Grant, Bart. Granted 1870.

Dumbartonshire.

10. VALE OF LEVEN AND DUMBARTON HORTICULTURAL SOCIETY.—*Convener*, Sir James Lumsden of Arden; *Secretary*, John M'Kinnon, Cordale Cottage, Renton. Granted 1872.

Elginshire.

11. MULBEN.—*Convener*, Alexander Paterson, Mulben, Keith. Granted 1873.

Kincardineshire.

12. FETTERCAIRN AMATEUR HORTICULTURAL SOCIETY.—*Convener*, Lieut.-Col. M'Inroy of The Burn, Brechin; *Secretary*, James Robb, Fettercairn. Granted 1873.
13. MEARNS AMATEUR HORTICULTURAL SOCIETY.—*Convener*, Sir Thomas Gladstone of Fasque, Bart.; *Secretary*, James Burgess, Laurencekirk. Granted 1870.

Lanarkshire.

14. EASTERN DISTRICT OF GLASGOW HORTICULTURAL SOCIETY.—*Secretary*, Thomas Anderson, Provan Mill, Glasgow. Granted 1870.

15. HUTCHESONTOWN GARDENS.—*Secretary*, Hugh A. Hopkins, 75 Hospital Street, Glasgow. Granted 1872.

16. MOSSEND AND CARNBROE—*Secretary*, J. C. Sloan, Mossend Cottage, Bellshill. Granted 1870.

17. NEW VICTORIA GARDENS, Govanhill.—*Secretary*, Peter M'Dowall, 51 Abbotsford Place, Glasgow. Granted 1870.

18. SHETTLESTON HORTICULTURAL SOCIETY.—*Secretary*, James Barr, Eastmuir, Shettleston. Granted 1872.

19. UDDINGSTON SOCIETY.—*Convener*, Thomas Scott of Croftbank, Uddingston; *Secretary*, Robert Bruce, Uddingston. Granted 1870.

Linlithgowshire.

20. ECCLESMACHAN.—*Convener*, James Thomson, Holms, Broxburn; *Secretary*, James Cunningham, teacher, Ecclesmachan. Granted 1871.

Peeblesshire.

21. WEST LINTON SOCIETY.—*Convener*, W. A. Woddrop of Dalmarnock; *Secretary*, Archibald Alexander, West Linton, Penicuik. Granted 1870.

Perthshire.

22. CULROSS SOCIETY.—*Convener*, John James Dalgleish of West Grange; *Secretary*, Robert Carmichael, Newfarm, Culross. Granted 1870.

23. LOGIEALMOND AND GLENALMOND SOCIETY.—*Convener*, ; *Secretary*, D. Paton, Woodburn, Harrietfield, Perth. Granted 1870.

24. SLIOSGARBH SOCIETY.—*Convener*, Mrs Robertson, sen. of Struan; *Secretary*, Ewan Cameron, Croiscraig, Pitlochrie. Granted 1870.

25. WEEM AND BREADALBANE.—*Convener*, E. O. Douglas of Killiechassie, Aberfeldy; *Secretary*, Peter Haggart, Keltneyburn, Aberfeldy. Granted 1870.

REGULATIONS.

1. Competitions may take place in the different districts for Cottages and Gardens, or for either separately.

2. The annual value of each Cottage, with the ground occupied in the parish by a Competitor, must not exceed L.15.

3. If Competition takes place for Garden Produce in place of the best kept Garden, such produce must be *bona fide* grown in the Exhibitor's Garden, and he will not be allowed to make up a Collection from any other Garden.

4. Blank reports will be furnished to the Conveners and Secretaries of the different Districts. These must, in all details, be completed and lodged with the Secretary *on or before the 1st November next*, for the approval of the Directors, against whose decisions there shall be no appeal.

3. IMPROVING EXISTING COTTAGES.

To the Proprietor in Scotland who shall report the Improvement of the greatest number of Cottages in the years 1871, 1872, and 1873—The Gold Medal .

4. BUILDING NEW COTTAGES.

To the Proprietor in Scotland who shall report the Erection of the greatest number of approved Cottages during the years 1870, 1871, 1872, and 1873—The Gold Medal.

RULES OF COMPETITION.

1. Claims for the Premiums Nos. 3 and 4 must be lodged with the Secretary on or before the 1st of October next, to allow an inspection to be made of the different Cottages. The inspection will be conducted by a Committee of the Society's Members, and Reports must be transmitted to the Secretary *on or before the 1st November.*

2. The annual value of the Cottage or Cottages separately, with the garden ground, must not exceed L.5.

3. In estimating the claims of the Competitors, the following points will be kept in view:—The external appearance of the Cottages; their internal accommodation; the arrangements of the out-houses; the means of drainage and ventilation; and the expense of the building or of the alteration, compared with its durability and accommodation. When the Cottages of one Competitor are superior in style and comfort to those of another, though not so numerous, the Inspectors will give them the preference, provided they amount at least to three, and have been erected at a moderate expense.

4. Parties competing will forward to the Society Plans, Specifications, and Estimates, of which, and of all information sent therewith, copies may be taken for publication, if the Society shall see fit, and the originals returned to the parties within six months if desired.

GENERAL SHOW OF STOCK AND IMPLEMENTS

AT

INVERNESS

ON 28TH, 29TH, 30TH, AND 31ST JULY 1874.

President of the Society.

His Royal Highness the PRINCE of WALES.

Convener of the Local Committee.

The Hon. The MASTER of LOVAT.

The District connected with the Show comprises the Counties of INVERNESS, ELGIN, NAIRN, ROSS and CROMARTY, CAITHNESS, SUTHERLAND, and ORKNEY and SHETLAND.

GENERAL ARRANGEMENTS.

STOCK AND POULTRY

To be entered with the Secretary on or before Friday, 12th June. Received in the Yard on Monday, 27th, and till noon on Tuesday, 28th July. Judged at 1 P.M. on Tuesday. Exhibited on Tuesday, Wednesday, Thursday, and Friday, 28th, 29th, 30th, and 31st July.

IMPLEMENTS

To be entered with the Secretary on or before Friday, 12th June. Received in the Yard on Tuesday, 21st July, and till the evening of Monday, 27th July. Exhibited Tuesday, Wednesday, Thursday, and Friday, 28th, 29th, 30th and 31st July.

TERMINATION OF SHOW.

Friday, 31st July, at 5 P.M. Stock and Implements may remain in the Yard till Saturday afternoon.

The Competition is open to Exhibitors from all parts of the United Kingdom.

Members of the Society are admitted free during the Show.

New Members may be proposed for election at the General Meeting in June, and if on the list of Candidates may enter at Members' rates; but all entries must be made on or before 12th June.

PREMIUMS.

The Medium Gold Medal will be given to any animal which, having gained the Society's highest Premium at Kelso 1872, *or Stirling* 1873, *in the Classes of Aged Bulls—Cows—Stallions—or Mares, is disqualified from again competing.* See General Conditions Nos. 20 and 21.

CLASS I.—CATTLE.

SHORT-HORN.

Section		
1.	Best Bull calved before 1st Jan. 1872,	£25
	Second best,	15
	Third best,	10
	Fourth best (Reserve Number),	...
	Breeder of best Bull, The Silver Medal.	
2.	Best Bull calved after 1st Jan. 1872,	25
	Second best,	15
	Third best,	10
	Fourth best (Reserve Number),	...
3.	Best Bull calved after 1st Jan. 1873,	15
	Second best,	10
	Third best,	5
	Fourth best (Reserve Number),	...
4.	Best Cow of any age,	20
	Second best,	10
	Third best,	5
	Fourth best (Reserve Number),	...
5.	Best Heifer calved after 1st Jan. 1872,	15
	Second best,	10
	Third best,	5
	Fourth best (Reserve Number),	...
6.	Best Heifer calved after 1st Jan. 1873,	10
	Second best,	8
	Third best,	4
	Fourth best (Reserve Number),	...
		£217

POLLED ANGUS OR ABERDEEN.

7.	Best Bull calved before 1st Jan. 1872,	£20	
	Second best,	10	
	Third best,	5	
	Fourth best (Reserve Number),	...	
	Breeder of best Bull, The Silver Medal.		
	Carry forward	£35	£217

POLLED ANGUS OR ABERDEEN—*continued.*

Section			
	Brought forward,	£35	£217
8.	Best Bull calved after 1st Jan. 1872,	20	
	Second best,	10	
	Third best,	5	
	Fourth best (Reserve Number),	...	
9.	Best Bull calved after 1st Jan. 1873,	10	
	Second best,	5	
	Third best,	3	
	Fourth best (Reserve Number),	...	
10.	Best Cow of any age,	20	
	Second best,	10	
	Third best,	5	
	Fourth best (Reserve Number),	...	
11.	Best Heifer calved after 1st Jan. 1872,	10	
	Second best,	6	
	Third best,	4	
	Fourth best (Reserve Number),	...	
12.	Best Heifer calved after 1st Jan. 1873,	8	
	Second best,	5	
	Third best,	3	
	Fourth best (Reserve Number),	...	
			159

GALLOWAY.

13.	Best Bull calved before 1st Jan. 1873,	20	
	Second best,	10	
	Third best (Reserve Number),	...	
	Breeder of best Bull,	The Silver Medal.	
14.	Best Cow of any age,	15	
	Second best,	8	
	Third best (Reserve Number),	...	
15.	Best Heifer calved after 1st Jan. 1872,	10	
	Second best,	5	
	Third best (Reserve Number),	...	
16.	Best Heifer calved after 1st Jan. 1873,	8	
	Second best,	4	
	Third best (Reserve Number),	...	
			80

AYRSHIRE.

17.	Best Bull calved before 1st Jan. 1873,	20	
	Second best,	10	
	Third best,	5	
	Fourth best (Reserve Number),	...	
	Breeder of best Bull,	The Silver Medal.	
18.	Best Cow, in Milk, of any age,	15	
	Second best,	8	
	Third best,	4	
	Fourth best (Reserve Number),	...	
	Carry forward,	£62	£456

AYRSHIRE—*continued.*

Section			
	Brought forward,	£62	£456
19.	Best Cow in Calf, of any age, or Heifer in Calf, calved before 1st Jan. 1872,	15	
	Second best,	8	
	Third best,	4	
	Fourth best (Reserve Number),	...	
20.	Best Heifer calved after 1st Jan. 1872,	10	
	Second best,	5	
	Third best,	3	
	Fourth best (Reserve Number),	...	
21.	Best Heifer calved after 1st Jan. 1873,	8	
	Second best,	4	
	Third best,	2	
	Fourth best (Reserve Number),	...	
			121

HIGHLAND.

22.	Best Bull calved before 1st Jan. 1871,	20	
	Second best,	10	
	Third best,	5	
	Fourth best (Reserve Number),	...	
	Breeder of best Bull, The Silver Medal		
23.	Best Bull calved after 1st Jan. 1871,	20	
	Second best,	10	
	Third best,	5	
	Fourth best (Reserve Number),	...	
24.	Best Bull calved after 1st Jan. 1872,	10	
	Second best,	5	
	Third best,	3	
	Fourth best (Reserve Number),	...	
25.	Best Bull calved after 1st Jan. 1873,	5	
	Second best,	3	
	Third best,	1	
	Fourth best (Reserve Number),	...	
26.	Best Cow of any age,	15	
	Second best,	8	
	Third best,	4	
	Fourth best (Reserve Number),	...	
27.	Best Heifer calved after 1st Jan. 1871,	10	
	Second best,	5	
	Third best,	3	
	Fourth best (Reserve Number),	...	
28	Best Heifer calved after 1st Jan. 1872,	8	
	Second best,	4	
	Third best,	2	
	Fourth best (Reserve Number),	...	
	Carry forward,	£156	£577

HIGHLAND—*continued.*

Section			
	Brought forward,	£156	£577
29.	Best heifer calved after 1st Jan. 1873,	5	
	Second best,	3	
	Third best,	1	
	Fourth best (Reserve Number),	...	
			165

FAT STOCK.

30.	Best Shorthorn Ox calved after 1st Jan. 1871,	6	
	Second best,	3	
	Third best (Reserve Number),	...	
31.	Best Shorthorn Ox calved after 1st Jan. 1872,	5	
	Second best,	2	
	Third best (Reserve Number),	...	
32.	Best Highland Ox calved after 1st Jan. 1870,	6	
	Second best,	3	
	Third best (Reserve Number),	...	
33.	Best Ditto, calved after 1st Jan. 1871,	5	
	Second best,	2	
	Third best (Reserve Number),	...	
34.	Best Ox, of any other Pure or Cross Breed calved after 1st Jan. 1871,	6	
	Second best,	3	
	Third best (Reserve Number),	...	
35.	Best Ditto, calved after 1st Jan. 1872,	5	
	Second best,	2	
	Third best (Reserve Number,)	...	
36.	Best Cross-bred Heifer, calved after 1st Jan. 1871,	6	
	Second best,	3	
	Third best (Reserve Number),	...	
37.	Best Cross-bred Heifer, calved after 1st Jan. 1872,	5	
	Second best,	2	
	Third best (Reserve Number),	...	
			64
			£806

CLASS II.—HORSES.

SECTION	FOR AGRICULTURAL PURPOSES.	
1.	Best Stallion foaled before 1st Jan. 1871,	£30
	Second best,	20
	Third best,	10
	Fourth best (Reserve Number),	...
	Breeder of best Stallion, The Silver Medal.	
2.	Best Entire Colt foaled after 1st Jan. 1871,	20
	Second best,	15
	Third best,	10
	Fourth best (Reserve Number),	...
3.	Best Entire Colt foaled after 1st Jan. 1872,	15
	Second best,	8
	Third best,	4
	Fourth best (Reserve Number),	...
4.	Best Entire Colt foaled after 1st Jan. 1873,	10
	Second best,	5
	Third best,	3
	Fourth best (Reserve Number),	...
5.	Best Mare (with Foal at foot) foaled before 1st Jan. 1871,	20
	Second best,	10
	Third best,	5
	Fourth best (Reserve Number),	...
6.	Best Mare (in Foal) foaled before 1st Jan. 1871,	20
	Second best,	10
	Third best,	5
	Fourth best (Reserve Number),	...
7.	Best Filly foaled after 1st Jan. 1871,	10
	Second best,	5
	Third best,	3
	Fourth best (Reserve Number),	...
8.	Best Filly foaled after 1st Jan. 1872,	8
	Second best,	4
	Third best,	2
	Fourth best (Reserve Number),	...
9.	Best Filly foaled after 1st Jan. 1873,	6
	Second best,	3
	Third best,	1
	Fourth best (Reserve Number),	...
10.	Best Draught Gelding foaled after 1st Jan. 1871,	8
	Second best,	4
	Third best,	2
	Fourth best (Reserve Number),	...
	Carry forward,	£276

HORSES FOR AGRICULTURAL PURPOSES—*continued.*

Section			
	Brought forward,		£276
11.	Best Draught Gelding, foaled after 1st Jan. 1872,		6
	Second best,		3
	Third best,		1
	Fourth best (Reserve Number),		...
			286

HUNTERS AND ROADSTERS.

12.	Best Mare or Gelding suitable for Field, foaled before 1st January 1871,	£20	
	Second best,	10	
	Third best,	5	
	Fourth best (Reserve Number),	...	
13.	Best Mare or Gelding suitable for Carriage, foaled before 1st January 1871,	20	
	Second best,	10	
	Third best,	5	
	Fourth best (Reserve Number),	...	
14.	Best Mare or Gelding suitable as Hackneys or Roadsters, between 14 and 15 hands high,	8	
	Second best,	4	
	Third best,	2	
	Fourth best (Reserve Number),	...	
			84

PONIES.

15.	Best Mare or Gelding, between 13 and 14 hands high,	6	
	Second best,	3	
	Third best,	1	
	Fourth best (Reserve Number),	...	
16.	Best Mare or Gelding, between 12 and 13 hands high,	6	
	Second best,	3	
	Third best,	1	
	Fourth best (Reserve Number),	...	
17.	Best Entire Stallion, 12 hands and under,	6	
	Second best,	3	
	Third best,	1	
	Fourth best (Reserve Number),	...	
18.	Best Mare or Gelding, 12 hands and under,	6	
	Second best,	3	
	Third best,	1	
	Fourth best (Reserve Number),	...	
			40

THOROUGH-BRED STALLIONS.

Best Thorough-bred Stallion to serve in the District of the Show in season 1874,	50
	£460

CLASS III.—SHEEP.

Section			
	CHEVIOT.		
1.	Best Tup above one shear,		£12
	Second best,		6
	Third best,		3
	Fourth best (Reserve Number),		...
2.	Best Dinmont or Shearling Tup,		12
	Second best,		6
	Third best,		3
	Fourth best (Reserve Number),		...
3.	Best 5 Ewes above one shear,		10
	Second best,		5
	Third best,		2
	Fourth best (Reserve Number),		...
	Best Pen of Lambs shown with Ewes,		2
	Second best,		1
4.	Best 5 Shearling Ewes or Gimmers,		10
	Second best,		5
	Third best,		2
	Fourth best (Reserve Number),		...
			£79
	BLACKFACED.		
5.	Best Tup above one shear,	12	
	Second best,	6	
	Third best,	3	
	Fourth best (Reserve Number),	...	
6.	Best Dinmont or Shearling Tup,	12	
	Second best,	6	
	Third best,	3	
	Fourth best (Reserve Number),	...	
7.	Best 5 Ewes above one shear,	10	
	Second best,	5	
	Third best,	2	
	Fourth best (Reserve Number),	...	
	Best Pen of Lambs shown with Ewes,	2	
	Second best,	1	
8.	Best 5 Shearling Ewes or Gimmers,	10	
	Second best,	5	
	Third best,	2	
	Fourth best (Reserve Number),	...	
			79
	BORDER LEICESTER.		
9.	Best Tup above one shear,	12	
	Second best,	6	
	Third best,	3	
	Fourth best (Reserve Number),	...	
	Carry forward,	£21	£158

BORDER LEICESTER—*continued.*

SECTION			
	Brought forward,	£21	£158
10.	Best Dinmont or Shearling Tup,	12	
	Second best,	6	
	Third best,	3	
	Fourth best (Reserve Number),	...	
11.	Best 5 Ewes above one shear,	10	
	Second best,	5	
	Third best,	2	
	Fourth best (Reserve Number),	...	
12.	Best 5 Shearling Ewes or Gimmers,	10	
	Second best,	5	
	Third best,	2	
	Fourth best (Reserve Number),	...	
			76

LONG-WOOLLED OTHER THAN BORDER LEICESTER

13.	Best Tup above one shear,	8	
	Second best,	4	
	Third best,	2	
	Fourth best (Reserve Number),	...	
14.	Best Dinmont or Shearling Tup,	8	
	Second best,	4	
	Third best,	2	
	Fourth best (Reserve Number),	...	
15.	Best 5 Ewes above one shear,	6	
	Second best,	3	
	Third best,	1	
	Fourth best (Reserve Number),	...	
16.	Best 5 Shearling Ewes or Gimmers,	6	
	Second best,	3	
	Third best,	1	
	Fourth best (Reserve Number),	..	
			48

SOUTHDOWN.

17.	Best Tup of any age,	8	
	Second best,	4	
	Third best,	2	
	Fourth best (Reserve Number),	...	
18.	Best 5 Ewes of any age, or Gimmers,	6	
	Second best,	3	
	Third best,	1	
	Fourth best (Reserve Number),	...	
			24

SHROPSHIRE.

19.	Best Tup of any age,	8	
	Second best,	4	
	Third best,	2	
	Fourth best (Reserve Number),	..	
	Carry forward,	£14	£306

SHROPSHIRE—*continued*.

Section			
	Brought forward,	£14	£306
20.	Best 5 Ewes of any age, or Gimmers,	6	
	Second best,	3	
	Third best,	1	
	Fourth best (Reserve Number),	...	
			24

SHORT-WOOLLED OTHER THAN SOUTHDOWN AND SHROPSHIRE.

21.	Best Tup of any age,	8	
	Second best,	4	
	Third best,	2	
	Fourth best (Reserve Number),	...	
22.	Best 5 Ewes of any age, or Gimmers,	6	
	Second best,	3	
	Third best,	1	
	Fourth best (Reserve Number),	...	
			24

EXTRA SHEEP.

23.	Best 5 Cheviot Wethers, not above 3 shear,	4	
	Second best,	2	
	Third best (Reserve Number),	...	
24.	Best 5 Blackfaced Wethers, not above 4 shear,	4	
	Second best,	2	
	Third best (Reserve Number),	...	
25.	Best 5 Half-bred Hoggs, not above 1 shear,	4	
	Second best,	2	
	Third best (Reserve Number),	...	
26.	Best 5 Greyfaced Hoggs, not above 1 shear,	4	
	Second best,	2	
	Third best (Reserve Number),	...	
27.	Best 5 Wether Hoggs of any cross, not above 1 shear,	4	
	Second best,	2	
	Third best (Reserve Number),	...	
			30
			£384

CLASS IV.—SWINE.

Section		
1.	Best Boar, large breed,	£8
	Second best,	4
	Third best,	2
	Fourth best (Reserve Number),	...
2.	Best Boar, small breed,	8
	Second best,	4
	Third best,	2
	Fourth best (Reserve Number),	...
	Carry forward,	£28

SWINE—*continued.*

Section		
	Brought forward,	£28
3.	Best Sow, large breed,	6
	Second best,	3
	Third best,	1
	Fourth best (Reserve Number),	...
4.	Best Sow, small breed,	6
	Second best,	3
	Third best,	1
	Fourth best (Reserve Number),	...
5.	Best Pen of 3 Pigs, not above 8 months old, large breed,	4
	Second best,	2
	Third best,	1
	Fourth best (Reserve Number),	...
6.	Best Pen of 3 Pigs, not above 8 months old, small breed,	4
	Second best,	2
	Third best,	1
	Fourth best (Reserve Number),	...
		£62

EXTRA STOCK.

Animals not included in the Sections for Competition may be exhibited as Extra Stock, and will receive Honorary Premiums when specially commended.

CLASS V.—COLLIE DOGS.

Section		
1.	Best Dog, not exceeding 6 years old,	£2
	Second best,	1
2.	Best Bitch, not exceeding 6 years old,	2
	Second best,	1
		£6

CLASS VI.—POULTRY.

First Premium—One Sovereign; Second Premium—Ten Shillings—in all the Sections of Poultry.

Aged Birds must have been hatched previous to, and Cockerels and Pullets in, 1874.

	Section	*Section*
Dorking—*Silver Grey*,	1. Cock.	2. 2 Hens.
	3. Cockerel.	4. 2 Pullets
Dorking—*Coloured*,	5. Cock.	6. 2 Hens.
	7. Cockerel.	8. 2 Pullets.

POULTRY—*continued.*

	Section.	*Section.*
Cochin-China,	9. Cock.	10. 2 Hens.
	11. Cockerel.	12. 2 Pullets.
Brahmapootra,	13. Cock.	14. 2 Hens.
	15. Cockerel.	16. 2 Pullets.
Spanish,	17. Cock.	18. 2 Hens.
	19. Cockerel.	20. 2 Pullets.
Scotch Grey,	21. Cock.	22. 2 Hens.
	23. Cockerel.	24. 2 Pullets.
Hamburg—*Pencilled,*	25. Cock.	26. 2 Hens.
	27. Cockerel.	28. 2 Pullets.
Hamburg—*Spangled,*	29. Cock.	30. 2 Hens.
	31. Cockerel.	32. 2 Pullets.
Polish,	33. Cock.	34. 2 Hens.
	35. Cockerel.	36. 2 Pullets.
Game—*Black or Brown Reds,*	37. Cock.	38. 1 Hen.
	39. Cockerel.	40. 1 Pullet.
Game—*Duckwings,*	41. Cock.	42. 1 Hen.
	43. Cockerel.	44. 1 Pullet.
Bantams—*Game,*	45. Cock.	46. 1 Hen.
	47. Cockerel.	48. 1 Pullet.
Bantams—*Sebright,*	49. Cock.	50. 2 Hens.
	51. Cockerel.	52. 2 Pullets.
Bantams — *Any other Variety,*	53. Cock.	54. 2 Hens.
	55. Cockerel.	56. 2 Pullets.
Any other Pure Breed of Poultry,	57. Cock.	58. 2 Hens.
	59. Cockerel.	60. 2 Pullets.
Ducks—*White Aylesbury,*	61. Drake.	62. 2 Ducks.
	63. Drake (Young).	64. 2 Ducklings.
Ducks—*Rouen,*	65. Drake.	66. 2 Ducks.
	67. Drake (Young).	68. 2 Ducklings.
Ducks—*Any other Pure Breed,*	69. Drake.	70. 2 Ducks.
	71. Drake (Young).	72. 2 Ducklings.
Turkeys—*Black Norfolk,*	73. Cock.	74. 2 Hens.
	75. Cock (Poult).	76. 2 Hens (Poults).
Turkeys—*Any other Breed,*	77. Cock.	78. 2 Hens.
	79. Cock (Poult).	80. 2 Hens (Poults).
Geese—*Grey Toulouse,*	81. Gander.	82. 2 Geese.
	83. Gander (Young).	84. 2 Goslings.
Geese—*Embden,*	85. Gander.	86. 2 Geese.
	87. Gander (Young).	88. 2 Goslings.
Geese—*Any other Pure Breed,*	89. Gander.	90. 2 Geese.
	91. Gander (Young).	92. 2 Goslings.

Total amount of Poultry Premiums, £138.

CLASS VII.—IMPLEMENTS, &c.

NOTE.—*Under Implements are included those for Agriculture, Horticulture, and Forestry.*

Reference is made to the General Regulations for the terms on which Implements may be exhibited, and the conditions under which they will be tried and rewarded.

The Inspecting Committee are authorised to award Silver Medals for General Agricultural Collections, Inventions, or Improvements, where a trial is not practicable.

In addition, it is competent for the Local Committee to select any description of Implement they think proper for special trial. See Rule 57.

Collections of Articles not Agricultural will be received for exhibition, but such Collections will not be inspected by the Judges. See Rule 58.

ABSTRACT OF PREMIUMS.

		£	s.	d.
1.	Cattle,	£806	0	0
2.	Horses,	460	0	0
3.	Sheep,	384	0	0
4.	Swine,	62	0	0
5.	Collie Dogs,	6	0	0
6.	Poultry,	138	0	0
7.	Medium Gold Medals to former Prize Animals, say	100	0	0
8.	Six Silver Medals to Breeders of best Aged Bulls and best Stallion,	4	16	0
9.	Extra Stock, say	20	0	0
10.	Implements, say	50	0	0
		£2030	16	0

REGULATIONS.

GENERAL CONDITIONS.

1. Members of the Society are admitted to the Show-Yard without payment, on exhibiting a "*Member's Ticket.*" Tickets will be sent to all Members residing in the Counties connected with the Show—Inverness, Elgin, Nairn, Ross and Cromarty, Caithness, Sutherland, and Orkney and Shetland. Members residing in other localities must apply for Tickets at the Secretary's Office, 3 George IV. Bridge, Edinburgh, *not later than the* 18*th of July.*

2. No animal to be allowed to compete in more than one section.

3. All animals must be entered in the section applicable to their ages, and cannot be withdrawn after entry.

4. Stock must be *bona fide the property and in the possession of* the Exhibitor from the 12th June (the last day of Entry).

5. The schedule of Entry must be filled up so far as within the knowledge of the Exhibitor.

6. Breeding Stock must not be shown in an improper state of fatness, and the Judges will be prohibited from awarding Premiums to overfed animals.

7. The Competition of Thorough-bred Stallions will take place at Inverness on Friday, the 20th March, at One o'clock. All Entries must be made with the Secretary on or before Wednesday, the 18th March. The Horse shall be shown at least twice at the principal market towns in the district throughout the season till 18th July. Members of the Society who may offer Mares shall have a preference. The owner, to entitle him to the prize, must provide satisfactory evidence that his Stallion is a sure foal-getter. He will not be permitted to travel the Horse beyond the district allowed by the Society, under the penalty of forfeiting the Premium. If the successful competitor does not comply with the above regulations, he will not only forfeit the Premium, but will also be precluded from competing at any of the Society's future Exhibitions. Terms—£5, 5s. for thorough-bred mares, £3, 3s. for half-bred mares, and 5s. to the groom. The Premium will be paid along with the Premiums for the General Show in the month of November 1874, on a certificate by the committee in charge.

8. Aged Bulls and Stallions must have had produce, and, along with Two-year-old Bulls and Three-year-old Colts, have served within the year of the Show.

9. All Cows must have had calves previous to the Show, and when exhibited, they must either be in milk or in calf; if in milk, birth must have been within 9 months of the Show; if in calf, birth must be certified within 9 months after the Show. In the case of Ayrshire Heifers in Calf, calved before 1st January 1872, birth must be certified within 9 months after the Show.

10. All Milch Cows must have been milked dry the evening previous to being judged, and they must, while within the Show-Yard, be milked morning and evening. The Judges will be instructed to withhold the prizes from any animals overstrained or suffering from want of being milked.

11. Two-year-old Heifers—of the Short-horn and Polled Breeds—must be in calf when exhibited, and the premiums will be withheld till birth be certified, which must be within 9 months after the Show.

12. Mares in Section 5 must have produced foals after 1st January 1874, and foals must be at foot, except when death can be proved. Mares in Section 6 must be in foal, and awards will be suspended till birth is certified.

13. With reference to regulations 9 and 11, birth of at least a seven months' calf must be certified; and in regard to regulation 12, birth of at least a nine months' foal.

14. Horses entered as suitable for Field are expected to be jumped in the Horse Ring, but this is not compulsory except when the animals are being judged, and then only if required by the Judges.

15. The inspection of Horses as to soundness is left entirely to the Judges, who may consult the Society's Veterinary Surgeon if they deem it expedient.

16. No protests on veterinary grounds will be received.

17. All Ewes must have reared Lambs in 1874; and Ewes in Sections 3 and 7 (Cheviot and Blackfaced) must be in milk, and have their Lambs at foot. Fleeces must not be artificially coloured.

18. Sows must have reared pigs in 1874, or be in pig; and Pigs must belong to the same litter, and be uncut.

19. In Poultry the Aged Birds must have been hatched previous to, and Cockerels and Pullets in, 1874. In the sections for Hens and Pullets of the Game and Malay Breeds, the lots to consist of one bird only.

20. An animal which has gained a first premium at a General Show of the Society cannot again compete in the same section, except 2 year old Bulls in Sections 13 and 17, which may compete again at Glasgow in 1875.

21. First prize animals in the classes of Aged Bulls, Cows, Stallions, and Mares may be shown for the Medium Gold Medal at two consecutive Shows after gaining the first prize.

22. No animal shall bear on its rug, harness, pail, or other fittings, any initial, crest, or mark of ownership, nor be distinguished otherwise than by the number indicating its place in the Catalogue.

23. Commendations will be given for extra Stock only.

24. Should it be proved to the satisfaction of the Directors that an animal has been entered under a false name, pedigree, or description, for the purpose of misleading the Directors or Judges as to its qualification or properties, the case shall be reported to the first General Meeting, in order that the Exhibitor shall be disqualified from again competing at the Society's Shows, and his name, if he be a Member, struck from the roll.

25. When an animal has previously been disqualified by the decision of any Agricultural Association in Great Britain or Ireland, such disqualification shall attach, if the Exhibitor, being aware of the disqualification, fail to state it, and the grounds thereof, in his entry, to enable the Directors to judge of its validity.

26. The violation by an Exhibitor of any one of the Regulations will involve the forfeiture of all Premiums awarded to him.

27. Protests against the awards of the Judges must be lodged with the Secretary not later than 9 A.M. on Wednesday, 29th July, and parties must be in attendance at the Committee-Room, in the Show-Yard, at 10 A.M that day, when protests will be disposed of.

28. The Society shall not be liable for any loss or damage which Stock, Implements, or other articles may sustain at the Show, or in consequence of having been sent to it.

29. The decisions of the Board of Directors are final in all questions respecting Premiums, and it shall not be competent for any Exhibitor to appeal against such decisions to, nor seek redress in respect of them from, any other tribunal.

30. The Premiums awarded will be paid in November 1874, and, with the exception of Silver Medals, may be taken either in money or in plate.

CERTIFICATES OF ENTRY.

31. Every Lot must be intimated by a Certificate of Entry, lodged with the Secretary *not later than Friday, the 12th of June.* Printed forms will be issued on application to the Secretary, No. 3 George IV. Bridge, Edinburgh.

ADMISSION OF STOCK.

32. The Yard will be open for Stock on Monday, 27th July, and between Six and Twelve o'clock on the morning of Tuesday, 28th, after which hour no Stock can be admitted.

33. One Servant will be admitted in charge of each Lot. Bulls must be secured by a nose ring, with chain or rope attached, or with strong halters and double ropes, with a man on each side.

34. Servants in charge of Stock must bring their own buckets or pails, and a piece of rope to carry their forage. Covered accommodation will be erected for the whole of the Stock. Straw, hay, grass, and tares will be provided free by the Society during the four days of the Show; other kinds of food will be supplied at fixed prices in the forage yard. Any Servant removing bedding from an adjoining stall will be fined in double the amount taken. Exhibitors may fetch their own cake or corn to the Yard, but not grass, tares, hay, nor straw.

35. No animal to be taken out of its stall after 9 A.M during the Show, except by order of the Judges, or with permission of the Secretary. Those infringing this Rule will be fined 10s.

36. When the Stock is leaving the Yard, no animal is to be moved till

ordered by those in charge of clearing the Yard. Those transgressing this Rule will be detained till all the other Stock is removed.

37. Cattle, Sheep, or Swine cannot be removed from the Yard till Five P.M. on Friday, 31st July, except on certificate by the Veterinary Surgeon employed by the Directors.

38. Horses may be withdrawn at Six each evening on a deposit of L.2 for each animal, which shall be forfeited if the animal is not brought back at Half-past 7 o'clock the following morning. Those not in before 8 will forfeit 10s.

39. Smoking is strictly prohibited in the sheds, stables, and horse-ring gallery, and no lights allowed at night. Those infringing this Rule will be fined 10s.

PLACING AND JUDGING STOCK.

40. On Tuesday, 28th July, Exhibitors, and all others except Servants in charge of Stock, must leave the Yard at 12 noon. The Judges will commence their inspection at 1 P.M., when the public will be admitted. There shall be no award unless the Judges deem the animals to have sufficient merit, more especially if there is only one lot in a Section; and it shall be in their power to suggest the removal of any lot which appears to them unworthy of being placed in the Yard.

41. Two Members of Committee will attend each Section of the Judges. It will be their duty to see that no obstruction is offered to them, and that the space reserved for them is not encroached on; to communicate to the Secretary any question that may arise for the consideration of the Committee; to complete their reports; and to ticket the prize animals.

42. It shall not be competent for any Exhibitor, nor for his Factor or Land-Steward, to act as a Judge or Attending Member in any class in which he is competing; and no Exhibitor shall remain in charge of any lot, whether belonging to himself or another, while the Judges are in the Yard.

PLACING AND JUDGING POULTRY.

43. Poultry must be brought to the Show-Yard on Monday, 27th July, or between 6 and 12 o'clock on the morning of Tuesday, 28th July. No lot will be admitted without an Admission-order. Coops, food, and attendance will be found by the Society.

44. The Judges will commence their inspection at 1 P.M. on Tuesday.

45. No lot to be removed from the Yard till 5 P.M. on Friday.

PLACING, INSPECTING, AND JUDGING IMPLEMENTS.

46. All articles must be entered with the Secretary on or before 12th June, and Exhibitors must intimate whether they wish their goods placed under cover or not, and specify the space they require. For Rates, see Stall Rent, page 69.

47. The Yard will be open for the reception of Implements on Tuesday, 21st July, and till 10 A.M. on Tuesday, 28th July.

48. There must be attached to each Implement, when forwarded to the Show, a label bearing the Exhibitor's name, and that of the Implement.

49. The carriage of all Implements must be prepaid.

50. The articles of each Exhibitor will be all placed in one stand.

51. All Steam Engines and other Machines requiring fire must be heated with Coke.

52. No Steam Engine shall be driven in the Yard at a greater speed than 6 miles an hour.

53. Locomotive and Traction Engines and other Machines must not be moved from their places without permission of the Secretary.

54. All Machines to be in motion must be entered as such in the Certificate, and will be placed in the Motion Yard.

55. The Inspecting Committee will award such Silver Medals as they may deem proper for General Agricultural Collections, Inventions, or Improvements, where a trial is not practicable.

56. When an Implement or Machine is supposed to embrace a new invention, or improvement, the nature of such must be specified in the entry to enable the Directors to order an inspection with a view to a trial. Such trial, when recommended by the Inspecting Committee, will be instituted in a convenient locality, and at a season of the year suitable for the operation of the implement or machine, which, when thoroughly tested, will be entitled to such a Premium as the Directors may see fit to award, on the report of the Judges employed by them.

57. In addition, it is competent for the Local Committee to select any description of Implement they think proper for special trial. Such trial shall be conducted by the Local Committee, who shall undertake the whole arrangements for carrying out the same at a period of the year they consider suitable. The Directors shall award such Money Prizes or Medals on account of the Competitive Trials as may be arranged with the Local Committee.

58. Collections of Articles not Agricultural will be received for Exhibition, but such Collections will not be inspected by the Judges.

59. All articles must remain in the Yard till 5 P.M. on Friday, the 31st July, and may be kept there till the afternoon of Saturday.

STALL RENT.

Closed-in stables will be provided for all the horses, and covered accommodation for the whole of the other stock. The following rates shall be paid by Exhibitors when making their Entries:—

	Members.		Non-Members.	
	s.	*d.*	*s.*	*d.*
Cattle, ...	10	0	20	0
Stallions—3 and 2 year old entire Colts, .	20	0	30	0
All other Horses, ...	15	0	25	0
Sheep and Swine, per pen, . . .	8	0	15	0
Collie Dogs, ...	2	0	3	0
Poultry, per coop, ...	2	0	3	0
Implement Shedding, 20 feet deep, per foot,	2	0	3	0
Implements without Shedding, do., per foot,	Free*		1	0

No smaller space than 6 feet frontage can be allowed for Implements.

*The extent of open space given free to Implement Exhibitors who are Members of the Society is limited to 50 feet by 20; for additional space the charge is 1s. per foot.

Covered Booths for Offices can be had from £3, 10s. to Members, and £5 to Non-Members, according to size. Intimation to be made to the Secretary before the 1st of July.

ADMISSION-ORDERS.

Admission-Orders will be forwarded to Exhibitors by post previous to the Show.

ADMISSION OF PUBLIC.

The public will be admitted on Tuesday, 28th July, at 1 P.M., when the inspection by the Judges commences. Holders of Members' Tickets are admitted free; Exhibitors of Stock (not Members) will be charged 5s. for admission to the judging; all others 10s. The space reserved for the Judges will be enclosed by ropes, and no encroachment will be permitted.

Exhibitors of Implements and their attendants will be entitled to free entry during the Show, but must remain at their stalls during the judging of the stock on Tuesday.

On Wednesday, at 8 A.M., and throughout the Show, holders of Members' Tickets and Exhibitors will be admitted free.

The charges to others will be—Wednesday, from 8 A.M. till 5 P.M., 2s. 6d.; Thursday, from 8 A.M. till 1 P.M., 2s. 6d., after 1 o'clock, 1s.; Friday, from 8 A.M. till 12 noon, 1s., and from 12 till 5 P.M. 6d.

Placards are prohibited both inside the Show-Yard and on the outside of the Boundary Fence, with the exception of those belonging to Exhibitors, whose right is confined to their own stalls. No newspapers or any other article allowed to be carried about the Yard for sale. No strolling bands admitted.

Premium Lists, Regulations, and Certificates of Entry, may be obtained by applying at the Secretary's Office, No. 3 George IV. Bridge, Edinburgh.

All Communications should be addressed to FLETCHER NORTON MENZIES, Esq., *Secretary of the Highland and Agricultural Society of Scotland, No.* 3 *George IV. Bridge, Edinburgh.*

LAST DAY OF ENTRY—FRIDAY, 12TH JUNE.

RAILWAY ARRANGEMENTS FOR 1873.

CLEARING-HOUSE REGULATIONS.

1. Stock and implements to the Show to be charged full rates.

2. From the Show, if sold, full rates.

3. From the Show, if unsold, to be conveyed free back to the station whence they were sent, at owners' risk, on production of a certificate from the Secretary of the Agricultural Show to the effect that they are really unsold.

4. All the above to be carried at owners' risk.

5. When agricultural machines and implements are carried under these regulations to and from shows, they must be invoiced station to station at the ordinary rates. Delivery to, or collection from, the Show-Yard to be performed by, or at the expense of, the owners.

6. Regulations Nos. 1, 2, 3, as to cattle and horses, to apply only if traffic be conveyed in Cattle Waggons and by Goods Trains.

7. Poultry and Dogs to be charged full rates both ways.

8. No reduction in the ordinary rates for Horses or Cattle when conveyed in Horse boxes.

9. Parties requiring the exclusive use of a Horse-box for only one animal to be charged one fare and a half.

The North-Eastern Company dissent from these regulations, so far as they apply to cattle.

SPECIAL ARRANGEMENTS FOR 1873.

The North British Railway and branches (locally) will convey horses and cattle as follows:—Horse-boxes may be used for the conveyance by Passenger or Special Trains of horses and valuable cattle, on corresponding terms with those hitherto applied to the conveyance of those by Goods Trains, viz., Full fare to the Show, and free return, if unsold, on production of certificate from the Secretary of the Society. *Granted in* 1869, *and continued.*

The Highland Railway and the Great North of Scotland have agreed to give the same facilities as the North British. *These two Companies have all along granted these privileges.*

The Caledonian Railway Company will convey from the Show free, if unsold, in Horse-boxes, by Passenger or Special Trains, such Horses and Cattle as may have been conveyed by them in Horse-boxes to the Show at full rates. *Granted* 1870, *and continued.*

The Glasgow and South-Western will convey Stock and Implements at the following rates:—To the Show, full rates, and from the Show, if sold, full rates; if unsold, and on production of a certificate to that effect from the Secretary of the Show, they will be conveyed free to the station from which they were sent. Parties requiring a Horse-box for the conveyance of one animal will be charged fare and a half. Bulls, if conveyed in Horse-boxes, will be charged as one horse for every stall occupied. Poultry and Dogs will be charged full rates both ways. These rates are at owner's risk only, and do not include delivery or collection. The Company do not guarantee Horse-boxes. *Granted* 1871, *and continued.*

NOTE.—*The above arrangements were granted for last year; but owing to the Railway Companies not having authorised them for this year before going to press, they are not guaranteed in the meantime.*

GENERAL SHOW OF STOCK AND IMPLEMENTS

At GLASGOW, 1875.

The District connected with the Show comprises the Counties of Lanark, Ayr, Argyll, Renfrew, and Bute.

Premiums will be offered for the following Classes :—

CATTLE.

AYRSHIRE.

Bulls calved before 1st January 1873
Bulls calved after 1st January 1873
Bulls calved after 1st January 1874
Cows in milk calved before 1st January 1872
Cows in milk calved after 1st January 1872
Cows in calf of any age, or Heifers in calf calved before 1st January 1873
Heifers calved after 1st January 1873
Heifers calved after 1st January 1874

SHORT-HORN.

Bulls calved before 1st January 1873
Bulls calved after 1st January 1873
Bulls calved after 1st January 1874
Cows of any age.
Heifers calved after 1st January 1873
Heifers calved after 1st January 1874

POLLED ANGUS OR ABERDEEN.

Bulls calved before 1st January 1873
Bulls calved after 1st January 1873
Bulls calved after 1st January 1874
Cows of any age.
Heifers calved after 1st January 1873
Heifers calved after 1st January 1874

GALLOWAY.

Bulls calved before 1st January 1873
Bulls calved after 1st January 1873
Bulls calved after 1st January 1874
Cows of any age.
Heifers calved after 1st January 1873
Heifers calved after 1st January 1874

HIGHLAND.

Bulls calved before 1st January 1872
Bulls calved after 1st January 1872
Bulls calved after 1st January 1873
Cows of any age.
Heifers calved after 1st January 1872
Heifers calved after 1st January 1873

FAT STOCK.

Short-horn Oxen calved after 1st January 1872
Short-horn Oxen calved after 1st January 1873
Highland Oxen calved after 1st January 1871
Highland Oxen calved after 1st January 1872
Oxen of any other pure or cross breed calved after 1st January... 1872
Oxen of any other pure or cross breed calved after 1st January... 1873
Cross-bred Heifers calved after 1st January........ 1872
Cross-bred Heifers calved after 1st January........ 1873

HORSES

For Agricultural Purposes.

Stallions foaled before 1st January........ 1872
Entire Colts foaled after 1st January 1872
Entire Colts foaled after 1st January 1873
Entire Colts foaled after 1st January 1874
Mares with foal at foot, foaled before 1st January 1872
Mares in foal, foaled before 1st January 1872
Fillies foaled after 1st January........ 1872
Fillies foaled after 1st January........ 1873
Fillies foaled after 1st January........ 1874
Draught Geldings foaled before 1st January 1872
Draught Geldings foaled after 1st January 1872

THOROUGH-BRED STALLIONS.

Thorough-bred Stallions to serve in the District of the Show in Season 1875. To be shown at Glasgow in Spring 1875.

HUNTERS AND ROADSTERS.

Brood Mares, suitable for field, foaled before 1st January 1871
Yeld Mares or Geldings, suitable for field, foaled before 1st January 1871
Fillies or Geldings, suitable for field, foaled after 1st January ... 1871
Fillies or Geldings, suitable for field, foaled after 1st January ... 1872
Mares or Geldings, suitable for carriage, foaled before 1st January 1872
Mares or Geldings, suitable as Hackneys or Roadsters, between 14 and 15 hands high.
Mares or Geldings, not exceeding 15 hands, for milk carts of heavy draught.
Mares or Geldings, not exceeding 14½ hands, for milk carts of light draught.

PONIES.

Mares or Geldings between 13 and 14 hands high.
Mares or Geldings between 12 and 13 hands high.
Mares or Geldings, 12 hands and under.

SHEEP.

Ewes, Gimmers, Wethers, and Hoggs to be exhibited in pens of five.

CHEVIOT.

Tups above one shear.
Dinmont or Shearling Tups.
Ewes above one shear.
Shearling Ewes or Gimmers.

BLACKFACED.

Tups above one shear.
Dinmont or Shearling Tups.
Ewes above one shear.
Shearling Ewes or Gimmers.

BORDER LEICESTER.

Tups above one shear.
Dinmont or Shearling Tups.
Ewes above one shear.
Shearling Ewes or Gimmers.

COTSWOLD.

Tups of any age.
Ewes of any age, or Gimmers.

LINCOLN.

Tups of any age.
Ewes of any age, or Gimmers.

SOUTHDOWN.

Tups of any age.
Ewes of any age, or Gimmers.

SHROPSHIRE.

Tups of any age.
Ewes of any age, or Gimmers.

EXTRA SHEEP.

Cheviot Wethers not above four shear.
Blackfaced Wethers not above four shear.
Half-bred Hoggs not above one shear.
Greyfaced Hoggs not above one shear.
Wether Hoggs of any cross not above one shear.

Sheep not included in the above Classes must be entered as Extra Stock.

SWINE.

Pigs to be exhibited in pens of three.

Boars, large breed.
Boars, small breed.
Boars, Berkshire breed.
Sows, large breed.
Sows, small breed.
Sows, Berkshire breed.

Pigs not above 8 months old, large breed.
Pigs not above 8 months old, small breed.
Pigs not above 8 months old, Berkshire breed.

POULTRY.

To be shown in Pens of One Cock or Cockerel and Two Hens or Pullets of each of the following breeds, except in the sections for Hens and Pullets of the Game and Malay Breeds, where only one bird is required:—

Dorking—Silver-Grey.
Dorking—Coloured.
Cochin-China.
Brahmapootra.
Spanish.
Scotch Grey.
Hamburg—Pencilled.
Hamburg—Spangled.
Polish.
Game—Black or Brown Reds.
Game—Duckwings.
Bantams—Game.
Bantams—Sebright.
Bantams—Any other variety.
Any other pure Breed of Poultry.
Ducks—White Aylesbury.
Ducks—Rouen.
Ducks—Any other pure Breed.
Turkeys—Black Norfolk.
Turkeys—Any other Breed.
Geese—Grey Toulouse.
Geese—Embden.
Geese—Any other pure Breed.

DAIRY PRODUCE.

Butter—Cured, Powdered, and Fresh.
Cheese—Cheddar and any other variety.

LIST OF MEMBERS

OF THE

HIGHLAND AND AGRICULTURAL SOCIETY

ADMITTED SINCE THE LIST WAS PUBLISHED IN MARCH 1873.

25TH JUNE 1873.

ABERCROMBY, Sir Robert John, of Birkenbog, Bart., Forglen, Turriff.
Alston, David, Hyndford Wells, West Linton.
Anderson, James, Feorline, Strachlachlan, Inveraray.
Anderson, John, Chapel, Moffat.
Anderson, John, Strachurmore, Inveraray.
Anderson, Wm., Norton Mains, Ratho.
Andrew, Robert, Allens, Inchinnan, Paisley.
ARBUTHNOTT, The Hon. the Master of, Arbuthnott House, Fordoun.
AVELAND, The Right Hon. Lord.

Baird, Thomas, Hundleshope, Peebles.
BALFOUR of Burleigh, the Right Hon. Lord, Kennet House, Clackmannan.
Barclay, David, Randerstone, Crail.
Barty, James W., Procurator-Fiscal, Dunblane
Bissett, Hugh, Pitarrow, Laurencekirk.
Bisset, Thos. S., agricultural engineer, Blairgowrie.
Bland, Thomas, Greystone, Tullynessle, Alford, Aberdeenshire.
Breingan, Alexander, Helensburgh
Brock, William, Barns of Clyde, Yoker.
Brown, William, Pitnamoon, Laurencekirk.
Browne, Rev. W. H. Cave, Dunmore, Stirling.
Buchanan, David, Garscadden Mains, New Kilpatrick.
Buchanan, Robert, Letter Farm, Killearn.
Burness, William, Redford, Laurencekirk.
Burrell, James, Denovan Mains, Denny.

Carnegie, John, grain and commission agent, Stirling.
Chapman, James, Ballencrieff Mill, Bathgate.
Chapman, Mungo, auctioneer, Bathgate.
Charles, John, Town and County Bank, Tarland.
Christie, James, Bankend, Stirling.
Christie, James, Cultenhove Mains, St Ninians.
Clark, William, Northfield, Denny.
Clark, William, Hopewell, Tarland.
Common, James, Capplefoot, Lockerbie.
Coningham, W. J. C., Ellem Cottage, Dunse.
Coubro, John, Hawkhill, Kincardine-on-Forth.
Cowan, James, 10 North Queen Street, Glasgow.
Craig, D. B., Mount Pleasant, Thurso.
Craighead, James, Sillyflatt, Bervie.
Cunningham, David, Freugh, Stranraer.
Curror, Patrick Robert, The Lee, Edinburgh.

Dewar, James, Cairnston, Dunblane.
Donald, John, Aquherie, Stonehaven.
Douglas, John, Gartartan Cottage, Gartmore.
Downie, George, Balcomie, Crail.
Drummond, James, jun., Blacklaw, Dunfermline.
Drysdale, David, Newbigging, Fossaway, Kinross.
Drysdale, Robert, Old Mills, Craigforth, Stirling.
Dun, Peter, Kipphill, Kippen.

Edmond, William, Hillhead of Catter, Drymen.

Falconer, William, Candy, Drumlithie.
Findlay, Charles Bannatyne, Boturich, Dumbarton.
Fisher, Donald, Gartenkier, Tillicoultry.
Fisher, Henry, hotelkeeper, Castleton, Braemar.
Forbes, Robert, auctioneer, Stirling.
Forrest, Abram, of Calderhead, Auldhouseburn, Muirkirk.
Fortescue, Archer, of Kingcausie, Maryculter, Aberdeen.
Fraser, Henry Newby, Hay Close, Penrith.
Fraser, Wm. A., Brackla, Nairn.
Fryer, John J., musicseller, Dumfries.

Galashaw, Charles C., saddler, Alloa.
Galbraith, Thomas L., town-clerk, Stirling.
Gardiner, Patrick, Newbigging, Auchterarder.
Gardner, Wm., Kepdourie, Bucklyvie.
Gilchrist, John, Todhill, Larbert.
Gilmour, John, yr. of Lundin, Leven.
Glen, James, Rosebank, Luss.
Glendinning, George P., Dalmeny Park, Edinburgh.
Gold, Joseph, Murthly Farm, Perth.
Gordon, Carlos Pedro, of Wardhouse, Insch, Aberdeenshire.
Gordon, Captain George G., Miltown of Kilravock, Nairn.
Graham, Alexander, Blackwater, Kilmalcolm, Renfrewshire.
Grahame, James, of Auldhouse, Pollokshaws.
Granger, Andrew, Fettes, Inverness.
Gray, Andrew, West Plean, Stirling.
Gray, James, Birkenwood, Gargunnock.
Greenlees, Alex., Summerhill, Campbeltown.
Greig, David, Muircote, Tillicoultry.
Greig, James Booth, secretary, Kincardineshire Farmers' Club, Laurencekirk.
Grieve, James, Borthwickbrae Burnfoot, Hawick.

Hamilton, Robert, implement agent and maker, 27 Cockburn Street, Edinburgh.
Harley, D., Rosebank, Bonnington Road, Edinburgh.
Hart, Wm., Kirklands, Auchterarder.
Hawley, William, 27 Frederick Street, Edinburgh.
Holliday, Jonathan, West House, Abbey Town, Cumberland.

Inglis, Thomas, land steward, Stobo Mill, Stobo.
Irvine, George Forbes, Nigg, Parkhill.

Jardine, Andrew, Ballemenoch, Row.
Johnston, James, Greenburn, Gartincaber, Stirling.
Johnstone, James, Hunterheck, Moffat.
Johnstone, John, of Halleaths, Lockerbie.

King, Duncan, Kildean, Stirling.
King, William, junior, Earn, Gartincaber, Stirling.
Kinnear, Arthur W., jun., Stonehaven.
Kinross, Andrew, Whiteston, Dunblane.

Lauder, William, Locherlour, Crieff.
Lawrie, Alexander, implement and manure merchant, Laurencekirk.
Lawrie, John, Kirkland Hill, Leven.
Leith, Sir George H., of Ross, Bart., Ross Priory, Alexandria.
Lennox, James, Doune of Glendouglas, Luss.
Leslie, Robert C., of Butterglen, Dunkeld.
Lindsay, Jas., Whitecastles, Lockerbie.
Linton, Simon, Glenrath, Manor, Peebles.

M‘Alpine, James, tile manufacturer, Stirling.
M‘Auslan, James, Kirkmichael, Row.
MacDonald, Neil M‘Leod, of Dunach, Oban.
M‘Farlane, Colin, Greenfield, Row.
M‘Farlane, Duncan, Greenfield, Row.
Macfarlane, Lewis, Lettermay, Lochgoilhead, Greenock.
M‘Kean, John, grain merchant, Stirling.
M‘Lachlan, Colin, Woodend, Row.
M‘Laren, James, Little Sauchie, St Ninians.
M‘Laren, John, Craggish, Comrie.
M‘Lean, Daniel, Kersie Mains, Stirling.
Macmurrich, Peter, Kennet Village, Alloa.
M‘Nab, Donald, Duchlage, Luss.
M‘Nab, John, Bracklin, Callander.
M‘Nicol, John, Courshelloch, Clachan, Tarbert.
M‘Queen, James, Divers' Wells, Alloa.
M‘Rae, Ewan, Leackachan, Kintail, Lochalsh.
Mactaggart, Charles, banker, Campbeltown.
Marshall, James, of Duncrievie, Milnathort.
Mather, William, of Waterfoot, Mearns.
Maxwell, George, of Broomholm, Langholm.
Maxwell, Wm. Jardine, yr. of Munches, Dalbeattie.
Michael, James, Home Farm, Dunmore, Stirling.
Mill, Allan, Dods, Lauder.
Miller, Colin W., general agent, Bridge of Allan.

Mitchell, John, junior, Barcheskie, Rerrick.
Moffat, R. Carter, Prof. of Chemistry, Veterinary College, Glasgow.
Moir, James M'Arthur, of Hillfoot, Dollar.
Moir, James, junior, factor to the Earl of Kellie, Alloa.
Mollison, James, factor, Dochdarroch, Inverness.
Montgomery, Wm., jun., Stuck, Row.
Morrison, James M., banker, Stirling.
Muir, Andrew Lees, coal merchant, Stirling.
Muirhead, William, Pirnhall, Bannockburn.
Murray, James, of Gartur, Stirling.
Murray, John, Munnieston, Thornhill, Stirling.

Nimmo, And., of West Bank, Falkirk.
Nivison, Stewart, Lairdlaugh, Dalbeattie.

Ogilvie, Alex. M., Tillynaught, Portsoy.
Oliphant, Thomas, of Rossie, Bridge of Earn.
Oliver, Wm. M., Howpasley, Hawick.
Orr, James, Hill, Whitburn.
Orr, Thomas, Limerigg, Slamannan, Falkirk.

Panton, Wm., Maryfield, Blairgowrie.
Park, James D., engineer, Greenside Lane, Edinburgh.
Paton, Robert, West Drip, Stirling.
Patrick, James, Queenzieburn, Kilsyth.
Pennycook, William, Wester Logie, Dunkeld.
Pitblado, Charles B., Colton Mains, Dunfermline.
Pollok, John, of Blackhouse, Mearns.
Pretsell, James, Drummelzier Place, Rachan Mill, Biggar.

Reid, Alexander, architect, Elgin.
Richardson, Alexander, Castleton, Gorebridge.
Richardson, John, Brunton Place, Carlisle.
Risk, Rob., Drumbrae, Bridge of Allan.
Roberts, James, Lumgair, Stonehaven.
Robertson, James F., New Mains, Prestonkirk.
Robertson, John S., Callendar Park, Falkirk.
Rodgie, Henry, Rothes Estate Office, Leslie, Fife.

Sands, James, Milton. Burn of Cambus, Stirling.
Sands, Robert, Greenfoot, Gargunnock.
Scott, James G., New Inn, Bankfoot.
Shairp, William, Poppletrees, Dunmore, Stirling.
Sievwright, W., National Bank, Lerwick.
Sime, Peter W., 16 George Street, Edinburgh.
Smeaton, Rev. John (of Coul, Auchterarder), Tulliallan Manse.
Smith, James, Pitengardner, Fordoun.
Smith, John, Balmain, Fettercairn.
Smith, Thomas, Dunabie, Lockerbie.
Stewart, Charles, Tomintingle, Knockando, Craigellachie.
Stewart, John, jun., Greystone, Doune.
Stewart, Robert, Kippenross, Dunblane.
STUART, The Right Hon. Sir John, of Loch Carron, Ross-shire.

Terris, James, jun., Dullomuir, Blair-Adam.
Thomson, Mitchell, Lomond House, Trinity.
Tweedie, Alexander Gladstone, Glespin, Douglas, Lanarkshire.

Udny, John Henry Fullerton, of Udny and Dudwick, Aberdeenshire.
Ure, John, Westwood, Drip, Stirling.

Virtue, George, 14 Murray Place, Stirling.

Walker, Alex., of Findynate, Ballinluig.
Watt, Alex., Primrose, Dunfermline.
Wauchope, Andrew, Tillicoultry House, Tillicoultry.
Whyte, John, Ardencaple, Helensburgh.
Wightman, James C. Seton, Courance, Lockerbie.
Wilken, George, Waterside of Forbes, Alford.
Will, Robert W., S.S.C., 37 Albany Street.
Wilson, William (Ticksley, Sims, & Co.), Leigh, Lancashire.
Wilsone, Thomas, solicitor, Aberdeen.
Wood, Walter A., 77 Upper Thames Street, London.
Wright, Colin, Allangowan House, Bridge of Allan.

Young, George, auctioneer and farmer, Dollar.
Young, William, Taylorton, Stirling.
Young, Wm., Waterbank, Carmunnock.

21st JANUARY 1874.

Addie, Gavin, Viewpark, Uddingston.

Blair, John (of Messrs Davidson and Syme, W.S.), Greenhill Gardens, Edinburgh.
Blair, Patrick, advocate, Sheriff-substitute, Inverness.
Brooke, A. B., Cardney, Dunkeld.
Bruce, Andrew Hamilton, yr. of Falkland, Ladybank.

Campbell, John, Calton Spinning Co., 15 Exchange Square, Glasgow.
Chalmers, Archd., of Kipp, Dalbeattie.
Chisholm, John, land steward, Achnacarry, Fort-William.
Colquhoun, Rev. J. E. Campbell, Killermont, Glasgow.
Conacher, P. M., Gallin Cottage, Glenlyon, Aberfeldy.
Cooper, Wm. S., yr. of Failford, Tarbolton.
Costine, John, Lochvale, Dumfries.
Cruickshank, George, Ardmore, Tain.

Douglas, William, Arboll, Tain.
Duff, George Smyttan, Sanquhar House, Forres.
Duff, Thomas, of Garth, Aberfeldy.

Easton, R. F., 15 India Street, Glasgow.
Edgar, John, Kirkettle, Roslin.
Elliot, Robert Henry, of Clifton Park, Kelso.

Fergus, William, Craigour, Liberton.
Finnie, William, of Newfield, M.P., Kilmarnock.
Fisher, Arthur William, Hedgefield, Inverness.
Forbes, James, Tombreck, Glenbucket, Aberdeen.
Forbes, William Forbes, of Lochcote, Bathgate.
Fowler, William, of Asleed, Turriff.
France, Thomas, ironmonger, Maybole.
Fraser, Alex., Barrisdale, Inverness.

Galloway, Alex., C.E. (Killin), Great King Street, Edinburgh.
Gillanders, Geo., Rosemarkie, Fortrose.
Gibson, Thomas, 93 Princes Street, Edinburgh.
Glasgow, R. Bruce Robertson, of Montgreenan, Kilwinning.
Goodbrand, Jas. H., Cubnaha, Parkhill.
Gordon, James A., Udale, Invergordon.
Grant, Major William, Drumbuie, Glen Urquhart, Inverness.
Guild, James Lyon, Abbey, North Berwick.
Gunnis, George Panton, Leckie House, Stirling.

Haig, Jas. Richard, of Blairhill, Dollar.
Hall, John, Tomich, Invergordon.
Hamilton, Commander Alexander, of Rozelle, R.N., Ayr.
Hay, Alexander Penrose, Riverdale, Inverness.
Henry, John, S.S.C., 29 Rutland Square, Edinburgh.
Home, David Milne, yr. of Wedderburn, captain in the Royal Horse Guards.

Jamieson, Robert J., factor, Borrowstounness.

Kirkland, Major-General John Agmondisham Vesey, 1 Moray Place, Edin.
Knox, Robert, Woodside, Cambus.

Landale, John, of Woodbank, banker, Dunfermline.
Learmonth, James, flesher, Linlithgow.
Leith, James Forbes, of Whitehaugh, Alford, Aberdeenshire.
Leslie, William, of Nethermuir, Lord Provost of Aberdeen.
Love, James, Greenock.

M'Callum, Alex. Inglis, chemist and V.S., 5 Grassmarket, Edinburgh.
M'Connell, William, of Knockdolin, Girvan.
M'Dougall, Alex., merchant, 5 Dixon Street, Glasgow.
Macduff, Alex., of Bonhard, 12 Bruntsfield Place, Edinburgh.
M'Gregor, James, Mulderg, Fearn.
Macgregor, P. Comyn, Lonend House, Paisley.
M'Gregor, Roderick, of Brae Rannoch, Kincraig, Kingussie.
M'Kerrow, And., Auchenskeoch, Southwick, Dumfries.
M'Kirdy, Major-General D. Elliot (of Letham, Lanarkshire), New Club, Edinburgh.
Maclachlan, D., Lochgilphead.
M'Master, Allan, Glenhead House, Stranraer.
M'Rae, Duncan A., Fernaig, Strome Ferry.
Menzies, John, Caledonian Hotel, Inverness.
Miller, John, Seafield, Cullen.
Mitchell, James R., Drynie, Inverness.
Mitchell, William G., Auchindarroch, Ballachulish.
Mundell, John, Scallisaig, Glenelg.
Mure, James, editor of *Courant*, Edin.

Murray, Robert G., Spittal, Biggar.
Park, Ebenezer, engineer, Greenside Lane, Edinburgh.
Park, John, merchant, Leith.

Rankine, John, of Bassendean, Berwickshire.
Reddie, Captain John Griffiths, of Redhouse, Rickarton House, Stonehaven.
Reid, George, Baads of Drum, Peterculter, Aberdeen.
Richardson, George, 89 Wilson Street, Glasgow.
Robson, John, jun., Byrness, Rochester, Northumberland.
Ross, Angus, wool-broker, Fox Street, Glasgow.
Ross, John, Meikle Tarrel, Fearn, Tain.
Rutherford, Dr Jas., Argyllshire Lunatic Asylum, Lochgilphead.

Simson, C. S. Rankine, of Threepwood, Roxburghshire.
Skinner, W. M., Drumin, Ballindalloch.
Smith, Thomas, Raitloan, Nairn.
Smithson, Joseph S., general manager, W. & H. M. Goulding (Limited) North Wall, Dublin.
Steell, Gourlay, R.S.A., Edinburgh, animal portrait painter to the Society.
Stephenson, Richard, Chapel, Dunse.
Stratton, David, 13 Middleby Street, Edinburgh.
Syme, David, manager of Lawson Seed and Nursery Company, 4 Wharton Place, Edinburgh.

Thoms, George Hunter, yr. of Aberlemno, advocate, Sheriff of Caithness, Orkney, and Shetland.
Trotter, Angus, auctioneer, Inverness.
Turnbull, David, W.S., 12 Belgrave Crescent, Edinburgh.

Waddell, A. Peddie, 4 Great Stuart Street, Edinburgh.
Wilson, Jas., blacksmith, Linlithgow.
Wood, Christopher, Gallin Cottage, Glenlyon, Aberfeldy.
Wylie, James, Innerwick, Dunbar.

The following gentlemen, who hold the Diploma in Agriculture of the Society, were, in terms of the Bye-Laws, admitted free Life Members of the Society at the General Meeting on the 25th of June 1873 :—

Ashdown, A. H., Uppington, Salop.

Brown, Wm., jun., Earlsmill, Forres.
Browne, Colvile, Long Melford, Suffolk.
Brydon, Robert, The Dene, Seaham Harbour.

Campbell, Geo., Shanes Castle, Antrim.

Eley, Wm. Henry, Islingham, Frindsbury, Rochester, Kent.
Elliot, Thomas John, Wilton, Salisbury.

Gerrard, John, Veterinary Infirmary, Market Deeping.
Gigliolio, Italo, M.R.A.C., Florence.
Goddard, H. R., Belsay, Newcastle-on-Tyne.

Hetherington, John R., Carleton, Carlisle.
Hill, Arthur James, Bath.
Juckes, R. F., Cotwall, Wellington, Salop.

Milne, John, Mains of Laithers, Turriff.
Munby, Edward Charles, M.R.A.C., Clifton Holme, York.

Norman, Wm., Hall Bank, Aspatria.

Rome, Thomas, Groundslow, Staffordshire.

Smith, William B., Stoneleigh Villa, Leamington.

Torry, Adam Ogilvie, St Anne's, Coupar-Angus.

Wall, G. Y., jun., M.R.A.C., Durham.
Walton, George Kent, Long Compton, Shipston-on-Stour, Warwickshire.
Wilson, Jacob, Woodhorn Manor, Morpeth.

Number of Members in list published March 1873, ...	4205
Number of Members admitted in June 1873, ...	195
Number of Members admitted in January 1874, ...	94
Number of Holders of Agricultural Diploma—Life Members, .	22
Total, .	4516

F. N. MENZIES, *Secretary.*

EDINBURGH, *March* 1874.

INDEX.

Aberdeen, Report by a Committee of the Society on the Resolutions adopted by Meeting of Members held at Aberdeen, 356—Correspondence between The Marquis of Huntly and the Secretary, Appendix A, 9.
Aberdeenshire Woods, Forests, and Forestry, on, by Alexander Smith, 264.
Accounts. *See* Finance.
Address to The Queen on the Marriage of H.R.H. The Duke of Edinburgh, Appendix A, 22.
Address to H.R.H. The Duke of Edinburgh, Appendix A, 22.
Agricultural Class in Edinburgh University. Premiums awarded to Students, Appendix A, 6, 68.
Agricultural Education, Examinations fixed, Appendix A, 3—Report of Examinations, Appendix A, 4, 17—Students who have passed Examinations, Elected Life Members of the Society, Appendix A, 15; Council on, and Board of Examiners', Appendix B, 10—Bye-Laws, Appendix B, 11—List of Diploma-holders, Appendix B, 12—Syllabus of Examination, Appendix B, 12.
Agricultural Epidemics, Committee on, Appendix A, 4—Memorial to Government, Appendix A, 18—Reply from Board of Trade, Appendix A, 8, 33.
Agricultural Land, on the Reclamation and Protection of, by David Stevenson, 132.
Agriculture of the Islands of Orkney, by R. O. Pringle, 1—By Thomas Farrall, 68.
Agriculture of the Islands of Shetland, by Henry Evershed, 186—By Robert Scot Skirving, 229.
Aitchison, William, Death of, Appendix A, 5.
Analyses, Charges for, Appendix B, 20.
Analyses, Instructions for selecting Samples for, Appendix B, 20.
Anderson, Thomas, M.D., F.R.S.E., Chemist to the Society, Reports to General Meetings on the Chemical Department by, Appendix A, 17-27—Resignation of, Appendix A, 27.
Animals, Humanity to, Prize Essays on, noticed at General Meeting, Appendix A, 18.
Argyll Naval Fund, Report to General Meeting, 21st January 1874, Appendix A, 25—Abstract of Accounts for 1872-73, Appendix A, 74.
Autumn Manuring, on the comparative Advantages of applying Manure to the Stubble in Autumn, or in the Drills in Spring, for Turnips, Potatoes, or Beans, by Thomas Farrall, 174.

Ballarat Farmers' Club, Letter from Secretary of, Appendix A, 4.
Beans, on the comparative Advantages of applying Manure to the Stubble in Autumn, or in the Drills in Spring, for Turnips, Potatoes, or Beans, by Thomas Farrall, 174.
Bruce, George: On the comparative Productiveness of Turnips, 303.
Bye-Laws, Proposed Alterations on, Appendix A, 25.

Cattle Pathology, Report to General Meeting on Chair of, in Edinburgh Veterinary College, Appendix A, 32.
Cattle Trucks, Notice of Models of, invented by Andrew Milne, Appendix A, 6.
Chambers and Hall, Report on proposed new, for the Society, and Resolutions thereon by General Meeting, Appendix A, 32.
Charges for Analyses, Appendix B, 68.
Chemical Department: Proceedings of Committee, Appendix A, 2—Appointment of Professor James Dewar as Assistant Chemist, Appendix A, 2-17—Reports on, at General Meetings, by Dr Anderson, Appendix A, 17, 27

—By Professor Dewar, Appendix A, 28—Discussion at General Meeting, Appendix A, 28—Objects of Chemical Department, Appendix B, 19—Instructions for selecting Samples for Analyses, Appendix B, 20—Charges for Analyses, Appendix B, 20.
Colquhoun, Sir James, Bart., Death of, Appendix A, 13.
Committees for 1874, Appendix B, 7.
Condensed Peat, Specimens of, submitted to Board, Appendix A, 3.
Conifers, on the Stem and Branch Pruning of, by Robert Hutchison, 100—By John B. Webster, 106.
Conifers, on Trees chiefly, by Alex. Graham Speirs, 309.
Contagious Diseases (Animals) Act 1869, Memorial by the Society to the Privy Council, Appendix A, 3, 4—Letter from Mr Plummer of Sunderland Hall, Appendix A, 6—Statement to General Meeting, Appendix A, 21.
Coppice, on the Treatment and Management of Oak Coppice in Scotland, by Andrew Gilchrist, 118.
Cottage Competitions, Reports on, Appendix A, 12, 27—Premiums awarded in 1873, Appendix A, 66—Premiums offered in 1874, Appendix, B, 47.

Dewar, Professor James, F.R.S.E., Appointment of, as Assistant Chemist, Appendix A, 2-17—Report to General Meeting on Chemical Department, Appendix A, 28.
Directors and other Office-Bearers for 1874, Appendix B, 5.
District Competitions, Reports on, Appendix A, 12, 27—Premiums awarded in 1873, Appendix A, 53—Premiums offered in 1874, Appendix B, 33.
Drain-pipe, Description of a Perforated one, invented by Colonel Wm. Ross King, Appendix A, 11.
Dry Seasons, on the Effects of Wet as compared with, on Woods, Forests, Moors, Game, &c., by C. Y. Michie, 323.

Edinburgh, H.R.H. The Duke of, Address to, on his Marriage, Appendix A, 22.
Epidemics. *See* under Agricultural Epidemics.
Essays and Reports, Premiums awarded for, in 1873–74, Appendix A, 35—Premiums offered for, in 1874, Appendix B, 23.
Establishment for 1874, Appendix B, 5.
Evershed, Henry: On the Agriculture of the Islands of Shetland, 186.
Examiners in Agricultural Education, Appendix B, 11—Veterinary Department for 1873, Appendix B, 15—Forestry Department, Appendix B, 17.

Farrall, Thomas: On the Agriculture of the Islands of Orkney, 68—On the comparative Advantages of applying Manure to the Stubble in Autumn, or in the Drills in Spring, for Turnips, Potatoes, or Beans, 174.
Fattening Stock, on Experiments on, by Alfred Harwood, 312.
Fencing and Shelter of Mountain Sheep Walks, on, by Patrick R. Latham, 114.
Finance:—State of the Funds of the Society at 30th November 1873, Appendix A, 69—Abstract of the Accounts for 1872–3, Appendix A, 70—Abstract of the Accounts of the Stirling Show, 1873, Appendix A, 72—Accounts of the Argyll Naval Fund, 1872–3, Appendix A, 74.
Fir Forests, on the Growth and Managemens of Scotch, by J. B. Webster, 338.
Forestry Department: — Examination fixed, Appendix A, 3 — Report of Examination, Appendix A, 4, 17—Board of Examiners, Appendix B, 17. List of Candidates who have passed Examination, Appendix B, 17—Syllabus of Examination, Appendix B, 17.
Forests and Forestry, on Aberdeenshire Woods, by Alexander Smith, 264.
Forests, on the Effects of Wet as compared with Dry Seasons on, by C. Y. Michie, 323.
Forests, on the Growth and Management of Scotch Fir Forests, by John B. Webster, 338.

Game, on the Effects of Wet as compared with Dry Seasons on, by C. Y. Michie, 323.
Gilchrist, Andrew: On the Treatment and Management of Oak Coppice in Scotland, 118.
Glasgow Show, 1875, Proceedings in regard to, Appendix A, 9, 12, 14, 26—Classes of Stock, Appendix B, 72.
Grubbers, Report on Trial of those selected at Kelso, Appendix A, 6.

Hall and Chambers, Report on proposed new, for the Society, and Resolutions thereon by General Meeting, Appendix A, 32.
Harwood, Alfred: On Experiments on Fattening Stock, 312.
Highland and Agricultural Society:—Report by a Committee of the Society on the Resolutions adopted by Meeting of Members held at Aberdeen, 356

—Proceedings at Board Meetings, 1873-4, Appendix A, 1—Proceedings at General Meetings, June 1873, Appendix A, 15—January, 1874, Appendix A, 22.
Hiring Markets, Resolutions on, by Special Committee, Appendix A, 2.
Humanity to Animals, Prize Essays on, noticed at General Meeting, Appendix A, 18.
Hutchison, Robert: On the Stem and Branch Pruning of Conifers, 100—On the most Profitable Varieties of Trees for planting, with a view to early Realisation and Profit, especially Willows and Poplars, 347.

Improvement of Land in Scotland, Premiums for, Appendix A, 1.
Inverness Show, 1874:—Proceedings in regard to, Appendix A, 1, 4, 5, 9, 12, 14, 26—Premiums and Regulations, Appendix B, 53.

Judges, List of, at Stirling Show, 1873, Appendix A, 52.

Kelso Show, 1872, Report on Trial of Grubbers, selected at, Appendix A, 6—Transference of Premiums, Appendix A, 8.
King, Colonel Wm. Ross: Description of a Perforated Drain-pipe, by, Appendix A, 11.

Land, on the Reclamation and Protection of Agricultural, by David Stevenson, 132.
Land, Improvement of, in Scotland, Premiums for, Appendix A, 1.
Latham, Patrick R.: On Fencing and Shelter of Mountain Sheep Walks, 114.
Lawson, Charles, Death of, Appendix A, 13.

Manure, on the comparative Advantages of applying, to the Stubble in Autumn or in the Drills in Spring, for Turnips, Potatoes, or Beans, by Thomas Farrall, 174.
Marjoribanks, Lord, Death of, Appendix A, 8, 15.
Members, List of, admitted since January 1873, Appendix B, 76.
Memorials to Government: Contagious Diseases (Animals) Act, 1869, Appendix A, 2—Agricultural Epidemics in Stock and Crops, Appendix A, 18—Ordnance Survey of Scotland, Appendix A, 33.
Michie, C. Y.: On the Effects of Wet as compared with Dry Seasons on Woods, Forests, Moors, Game, &c., 323.
Moors, on the Effects of Wet as compared with Dry Seasons on, by C. Y. Michie, 323.

Oak Coppice, on the Treatment and Management of, in Scotland, by Andrew Gilchrist, 118.
Office-bearers of the Society for 1874, Appendix B, 5.
Ordnance Survey of Scotland, Memorial by Society to the Commissioners of Her Majesty's Works on, Appendix A, 33.
Orkney, on the Agriculture of the Islands of, by R. O. Pringle, 1—By Thomas Farrall, 68.

Peat, Specimens of Condensed, submitted to Board, Appendix A, 3.
Perforated Drain-pipe, Description of one invented by Col. Wm. Ross King, Appendix A, 11.
Ploughing Competitions, List of, held in 1872-73, Appendix A, 62.
Ploughing Competitions, Regulations for, Appendix B, 47.
Poplars, on the most Profitable Varieties of Trees for planting with a view to early Realisation and Profit, especially Willows and Poplars, by Robert Hutchison, 347.
Potato-diggers, Trial of those selected at Stirling, Appendix A, 12.
Potato Disease, Committee named to consider Draft Memorial to Government on, Appendix A, 4—Memorial, Appendix A, 18—Reply from Board of Trade, Appendix A, 8, 12, 33.
Potatoes, on the Comparative Advantages of applying Manure to the Stubble in Autumn or in the Drills in Spring, for Potatoes, Turnips, or Beans, by Thomas Farrall, 174.
Premiums awarded by the Society in 1873, Appendix A, 35.
Premiums offered by the Society in 1874, Appendix B, 23.
Pringle, R. O.: On the Agriculture of the Islands of Orkney, 1.
Proceedings at Board Meetings of the Society, 1873-74, Appendix A, 1.
Proceedings at General Meetings of the Society, June 1873, Appendix A, 15—January 1874, Appendix A, 22.
Pruning, on the Stem and Branch Pruning of Conifers, by Robert Hutchison, 100—By John B. Webster, 106.

Queen, The, Address to, on the Marriage

of H.R.H. The Duke of Edinburgh, Appendix A, 22.

Railway Cattle-Trucks, Notice of Models of, invented by Andrew Milne, Appendix A, 6.
Reapers, Trial of those selected at Stirling, Appendix A, 12.
Reclamation and Protection of Agricultural Land, on, by David Stevenson, 132.

Scotch Fir Forests, on the Growth and Management of, by John B. Webster, 338.
Sheep Walks, on Fencing and Shelter of, by Patrick R. Latham, 114.
Shetland, on the Agriculture of the Islands of, by Henry Evershed, 186—By Robert Scot Skirving, 229.
Skirving, Robert Scot: On the Agriculture of the Islands of Shetland, 229.
Smith, Alexander: On Aberdeenshire Woods, Forests, and Forestry, 264.
Speirs, Alex. Graham: On Trees, chiefly Conifers, 309.
Spring Manuring, on the comparative Advantages of applying Manure to the Stubble in Autumn, or in the Drills in Spring, for Turnips, Potatoes, or Beans, by Thomas Farrall, 174.
Steam Cultivation, Letter from Mr Howard, M.P., as to Public Exhibition of, in Scotland, Appendix A, 11—Recommendation to hold one, Appendix A, 14—Report to General Meeting, Appendix A, 34.
Stevenson, David: On the Reclamation and Protection of Agricultural Land, 132.
Stirling Show, 1873:—Site for Show Yard, Appendix A, 1, 3—Competition of Thoroughbred Stallions, Appendix A, 1, 4—Local Committee, Appendix A, 4, 5, 15—Contracts, Appendix A, 7—Awards Confirmed, Appendix A, 9—Trial of Reapers and Potato-diggers, Appendix A, 12—Reports on, at General Meetings, June 1873, Appendix A, 15—January 1874, Appendix A, 25—Premiums Awarded, Appendix A, 35—Judges, Appendix A, 52—Abstract of Accounts, Apdix A, 72.
Stock, on Experiments on Fattening, by Alfred Harwood, 312.

Trees, chiefly Conifers, on, by Alexander Graham Speirs, 309.
Trees, on the most Profitable Varieties of, for planting with a view to early Realisation and Profit, especially Willows and Poplars, by Robert Hutchison, 347.
Trials:—Of Grubbers selected at Kelso, Appendix A, 6—Of Reapers and Potato-diggers, selected at Stirling, Appendix A, 12.
Turnips, on the comparative Advantages of applying Manure to the Stubble in Autumn, or in the Drills in Spring, for Turnips, Potatoes, or Beans, by Thomas Farrall, 174.
Turnips, on the comparative Productiveness of, by George Bruce, 303.

Veterinary Department:—April Examinations fixed, Appendix A, 4—July Examinations fixed, Appendix A, 8—Report of Examinations, Appendix A, 6, 10, 17—Circular from Town Clerk of Edinburgh in regard to the Establishment of a New Veterinary College in Edinburgh, with Resolution thereon by Directors, Appendix A, 10—Warrant for Establishment of New Veterinary College in Edinburgh, Appendix A, 12—Report to General Meeting on Chair of Cattle Pathology, Appendix A, 32—Medals awarded to Students, Appendix A, 68—Note as to the Institution of the Veterinary Department, Appendix B, 14—Board of Examiners for 1873, Appendix B, 15—Syllabus of Examination, Appendix B, 15.

Webster, John B.: On the Stem and Branch Pruning of Conifers, 106—On the Growth and Management of Scotch Fir Forests, 338.
Wet Seasons, on the Effects of, as compared with Dry, on Wood, Forests, Moors, Game, &c., by C. Y. Michie, 323.
Willows, on the most Profitable Varieties of Trees for planting, with a view to early Realisation and Profit, especially Willows and Poplars, by Robert Hutchison, 347.
Woods, on Aberdeenshire, Forests, and Forestery, by Alexander Smith, 264.
Woods, on the Effects of Wet, as compared with Dry Seasons, on, by C. Y. Michie, 323.

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